AN

ESSAY

ON

DISEASES

INCIDENTAL TO

EUROPEANS IN HOT CLIMATES.

WITH THE METHOD OF

PREVENTING THEIR FATAL CONSEQUENCES.

BY JAMES LIND, M.D. F.R.S. Ed.

Fellow of the Royal Society of Medicine at Paris, and of the Royal Colleges of Physicians at Edinburgh and Copenhagen; late Physician to the Royal Hospital at Haslar, near Portsmouth.

TO WHICH IS ADDED, AN

APPENDIX,

CONCERNING

INTERMITTENT FEVERS;

AND

A SIMPLE AND EASY WAY TO RENDER SEA WATER FRESH, AND TO PREVENT A SCARCITY OF PROVISIONS IN LONG VOYAGES AT SEA.

SIXTH EDITION.

Ars quæ sanitati tuendæ præsidet, iis qui sibi paruerint constantem sanitatem promittit. GALEN.

LONDON:

PRINTED FOR J. AND J. RICHARDSON; J. WALKER; LONGMAN, HURST, REES, AND ORME; J. MURRAY; J. CALLOW; AND E. COX; AND A. CONSTABLE AND CO. EDINBURGH.

1808.

Printed by B. McMillan,
Bow Street, Covent Garden.

TO

PHILIP STEPHENS, Esq.

SECRETARY TO THE ADMIRALTY.

SIR,

MY former attempts in the literary way, having been honoured with your approbation and protection, I presume to prefix your name to this Work; not only as an ornament to my labour, but as a small instance of gratitude for the friendship with which you have distinguished,

SIR,

Your most obliged,

And most obedient Servant,

JAMES LIND.

CONTENTS.

Introduction, ... page 1

PART. I.

The Seasons of Sickness, and the Diseases incidental to Strangers, in different Parts of the World.

CHAP. I.

MOST UNWHOLESOME SEASONS, AND THE DISEASES, IN EUROPE AND NORTH AMERICA.

SECT. I.

Unwholesome Season in England, and the Diseases produced by it: in the Netherlands, Hungary, Campania of Rome, the Islands of Sardinia and Minorca, Gibraltar, ... 19

SECT. II.

Of Canada, Newfoundland, Halifax, New England, Maryland, Virginia, South Carolina, Georgia, Florida, Mobile, Pensacola, ... 34

CHAP. II.

MOST UNWHOLESOME SEASONS, AND THE DISEASES IN AFRICA.

SECT. I.

Of Algiers, Tunis, Tripoli, Morocco, Egypt, page 39

SECT. II.

Of the Coast of Guinea. Its Soil, Periodical Rains, and Heat. Its healthy and sickly Seasons. Quantity and Effects of the Rains. Surprising Effects of the Harmattans. Comparative degrees of Health in the different European Settlements. Its Diseases. The Waters of the Country examined. A proposal to prevent the Guinea Worm. Whence the violence and mortality of Diseases in Guinea. A Journal kept in a Voyage to Catchou. Medical Directions, 42

SECT. III.

Of the Canaries, Cape de Verd Islands. The Islands of St. Thomas, Princess, Ferdinando Po, St. Helena. Cape of Good Hope. Madagascar. Mascarenhas. Mauritius. Eastern Shores of Africa, ... 83

CHAP. III.

MOST UNWHOLESOME SEASONS, AND THE DISEASES IN THE EAST INDIES.

SECT. I.

Periodical Sickness in the English Factories in Arabia and Persia, &c. .... page 87

SECT. II.

The four English Presidentships in India. Their comparative Degrees of Health. Diseases, 90

SECT. III.

The Settlements of other European Nations in India. Medical Directions. Mr. Ives's curious Observations made in a Journey from India to Europe by land, ... 99

CHAP. IV.

MOST UNWHOLESOME SEASONS, AND THE DISEASES IN THE WEST INDIES.

SECT. I.

Comparative Degrees of Health in the English Settlements; in the French, the Dutch, the Spanish, ... 127

SECT. II.

Diseases of the West Indies. Account of the Yellow Fever; that Disease shewn to be the common West India Fever in a virulent degree:

a Disease similar to it at Cadiz. The French and Dutch Accounts of the Diseases in the West Indies. The dreadful Mortality occasioned by them among the English at the Bastimentos, Carthagena, and the Havannah, page 132

PART II.

Advice to Europeans, for the Preservation of Health in hot Climates.

CHAP. I.

ADVICE FOR THE PRESERVATION OF EUROPEANS RESIDENT NEAR THE SEA.

SECT. I.

Signs of an unhealthy Country. Of the hot Land-winds, ... 149

SECT. II.

Employments which prove most fatal to Europeans, in hot and unwholesome Climates, 157

SECT. III.

The Diseases incident to Strangers, similar in different Climates; occur at particular Seasons; are confined to particular Situations. The Constitution of Europeans seasoned by Time to hot Climates. A Removal during the sickly Season recommended, ... 170

SECT. IV.

A convenient and safe Retreat from Sickness, pointed out, ... page 173

SECT. V.

Ships recommended to be used as Floating Factories, ... 181

SECT. VI.

An immediate change of Air recommended on the attack of Fevers, ... 188

SECT. VII.

Effects of a bad Air on Persons in Health; its Effects on such as are sick; Consequences of removing the Sick in Fevers, from a bad into a good Air. How long the Effects of bad Air lie concealed in the Body; how far the Fever thence produced is contagious, ... 193

SECT. VIII.

The Sea Air beneficial in Fevers; its Effects in an Epidemical Fever at Naples. An Infirmary-Ship recommended: Its peculiar Advantages. Of seasoning the Constitution to hot Climates. Sudden changes from Cold to Heat, and Heat to Cold, productive of the same Diseases, 206

CHAP. II.

ADVICE FOR THE PRESERVATION OF SUCH EUROPEANS IN HOT CLIMATES, AS RESIDE IN INLAND COUNTRIES.

SECT. I.

Europeans, during the sickly Season, to retire to healthy Situations. Unwholesome Spots of Ground to be found in the most healthy Countries; and healthy Spots in the most sickly Countries. Purity of the Air in many Places in the Torrid Zone, ... page 220

SECT. II.

An elevated and temperate Situation on the Side of a Hill, recommended as a Retreat from Sickness in hot Climates. This Asylum for Health to be met with in almost all Parts of the World, 227

SECT. III.

An Application of the Directions to the Island of Jamaica, ... 232

SECT. IV.

Particular Exceptions of no force against general Observation. Fatal Effects of remaining all Night in unhealthy Places. Sickness arising from that Circumstance, vulgarly ascribed to ridiculous Causes. A change of Air beneficial in all Epidemical Distempers, ... 238

SECT. V.

Directions more particularly for the Coast of Guinea. Unhealthy Settlements to be maintained by naturalizing the Natives. Military Establishments in such places to be recruited by Criminals. Necessary Directions for Soldiers, &c. on board of East India Ships, ... page 253

PART III.

Advice to Europeans, in Cases of Sickness in hot Climates.

CHAP. I.

DIRECTIONS FOR THE CURE OF THOSE DISEASES WHICH ATTACK EUROPEANS IN HOT CLIMATES.

SECT. I.

Fevers, ... 265

SECT. II.

The Dysentery and Cholera Morbus, ... 288

SECT. III.

The Dry Belly-ache, ... 293

SECT. IV.

The Tetanus and Locked Jaw, ... page 297

SECT. V.

The Barbiers, ... 300

CHAP. II.

DIRECTIONS FOR EUROPEANS ON THEIR RETURN HOME, WHOSE CONSTITUTIONS HAVE BEEN IMPAIRED ABROAD.

SECT. I.

Directions for those of a Relaxed and Bilious Habit of Body, ... 303

SECT. II.

Directions for those of Consumptive and Dropsical Habits of Body, ...305

SECT. III.

Directions for those who labour under an habitual Flux, ... 308

APPENDIX.

ON THE INTERMITTING FEVER.

Its similarity in England to the Endemic of hot Climates. Its Prevention. Its Cure. Treatment in the cold Fit, hot Fit, Intermission. Of the Bark. Requisite Preparation of the Body. Period of the Disease. Manner of exhibiting it. Treatment of Children. Treatment of Symptoms. Remedies when the Bark cannot be used. External Applications. Remedies used by the Vulgar. Treatment under imperfect Intermissions. Recommendation of Opium in the hot Fit, ... page 314

AN EASY WAY TO RENDER SEA WATER FRESH, AND TO PREVENT A SCARCITY OF PROVISIONS AT SEA.

Sea Water freshened by Distillation. General History of the Discovery. Objections obviated. Contrivances for distilling it. Large Quantity yielded by a Ship's Coppers; the requisite Time and Fuel. Examples of Distillation at Sea, with a Still, inverted Tea-kettle, Hand-pump. When fresh Water scarce, Provisions to be dressed in the Steam of Sea Water. In-

quiry into Substances of most Nutriment. Salep and Portable Soup contain most under the smallest Bulk; are cheap; easily prepared as Food, without Fire, with Sea Water; keep long. Recommended at Sea. Short Allowance. Money to be paid in the Merchant Service as in the Royal Navy, ... page 359

INTRODUCTION.

THE following sheets are presented to the public, as a sequel to what I have already published on the most effectual Means of preserving the Lives of Seamen, and such as undertake Voyages to distant Countries; or rather as a conclusion of all the considerations which I formerly offered on that most important, and most interesting subject.

In that Essay, my attention was principally directed to the preservation of people crowded together within the narrow limits of a ship, whether seamen, soldiers, or passengers.

After having supposed that these are safely landed, the following precepts, in addition to those I have already given, become highly necessary, to preserve unimpaired their health and constitutions during their residence in a foreign climate.

Thousands leave England every year, to go to the East and West Indies, or with the design of settling in some of our American Colonies. Many have lately gone to people those parts of America and the West India Islands, which were ceded to us by the last treaty of peace. Regiments are often sent out from England, to relieve others stationed in the most distant parts of the globe; and recruits for those regiments are still more frequently ordered abroad. This Essay is designed for the benefit of these several classes of British emigrants.

Men who thus exchange their native for a distant climate, may be considered as affected in a manner somewhat analogous to plants removed into a foreign soil; where the utmost care and attention are required, to keep them in health, and to inure them to their new situation; since, thus transplanted, some change must happen in the constitutions of both.

Some climates are healthy and favourable to European constitutions, as some soils are favourable to the production of European

plants. But most of the countries beyond the limits of Europe, which are frequented by Europeans, unfortunately prove very unhealthy to them. To ascertain the comparative degrees of health which Europeans enjoy in such countries; to point out the most effectual means of obviating the malignant effects of the climate, and to give the proper treatment of the diseases to which, in each, they are most exposed, constitute the subject of the following Treatise.

It is a subject of high importance: let us consider the unhappy fate of the first adventurers and discoverers of the southern parts of Africa, the Portuguese, who, in the 15th and 16th centuries, spread their settlements over the coast of Guinea and a great part of India. They suffered more by sickness than by shipwreck, though on an unknown coast, and even more by it than they did by their wars with the natives, and every other accident. In many places on the coast of Guinea, where they were formerly settled, we can now hardly trace any vestige of their posterity, but such as are of

the Mulatto breed. A corruption of their language, under the name of Lingua Franca, is the only memorial that they have left behind them.

Those first adventurers into the southern climates, seem to have had no knowledge of the true cause of their sickness. They observed, that such as had the good fortune to escape a fit of sickness, or death, soon after their arrival, enjoyed afterwards a pretty good state of health; and thence they concluded, that the blood of such persons had been entirely changed by the diet of the country. Upon this erroneous principle, they adopted a most fatal method of seasoning people to these unhealthy climates.

They, by small quantities, frequently repeated, took away as much blood, as they supposed to be contained in the body, and thus reduced the patient to a state of extreme weakness; supposing that this loss was immediately supplied by the food and water of the country, and that their blood was thereby composed of the same materials with that of the natives, they flattered

themselves, that they should afterwards possess constitutions equally calculated to bear the inconveniences of the climate.

Their absolute ignorance of the true causes of sickness in those climates, appears likewise from the bad situation of the places upon which they pitched for their settlements.

Thus, on the first discovery of the Cape de Verd Islands, the Portuguese proposed that the capital of all their dominions, in the northern parts of Guinea, should be placed in one of those islands. For this purpose, they fixed upon Saint Jago, the most unhealthy of them all, and, as has since clearly appeared, they founded their capital, upon even the most unhealthy spot of that island. Then, as if the natural evils of the situation and climate had not been sufficient, they added to them, by having wet ditches in their neighbourhood, the waters of which were perpetually stagnant. The great destruction which has befallen the Portuguese at that place, affords a most striking and melancholy proof of their error.

Several erroneous opinions have been entertained, concerning the causes of sickness in unhealthy climates. It has been a very general opinion, that the vegetable productions of unhealthful climates, are the cause of sickness in them to strangers: I have in another work observed*, that when Prince Eugene commanded in Hungary, in order to avoid the sickness of that country, all the provisions for his table were sent him from Germany. But the vegetable productions cannot be the causes of sickness in such climates, for two reasons: because rice, millet, Indian corn, and other productions of the most unhealthy countries, are eat safely, when brought from thence to other places: and in such unhealthy situations, the use even of the European productions for diet, does not preserve from sickness.

---

* In my Essay on preserving Seamen, p. 61. It is here necessary to observe in general, that the pages of my other works, occasionally quoted in this, refer to the last editions of them, viz. to the third edition of my Treatise on the Scurvy, the third of my Essay on preserving Seamen, and the second of my Dissertation on Fevers and Infection.

Further, the drinking of bad water has been highly blamed. Unwholesome water will certainly produce fluxes, and some other diseases. But whenever this is the sole cause, the diseases will be uniform at all seasons of the year; and the use of good water will effectually prevent them: neither of which, upon experience, we find to be the case, in the countries of which we treat.

Lastly, the irregularities of many young and thoughtless people who go to the East or West Indies, have been assigned as the principal causes of their sickness and death; thus it is often said, that they fall a sacrifice, not to the air of the country, but to their own debauchery. For if those who are newly arrived at Jamaica, drink immoderately of new rum, they will fall into a violent fever: if they commit any excess in eating fruits, they will have a flux: or if they load their stomach with indigestible food, they will have a cholera morbus, or a vomitting, which may carry them off in a few hours. But it is equally certain, that the

most abstemious and temperate persons often die soon, in unhealthy countries, as well as the irregular and debauched. Upon the whole, violent exercises, excessive drinking, and every species of intemperance, dispose the constitution to the attack of the epidemic diseases of hot climates: but they are no other than pre-disposing causes; the causa proxima, or the immediate cause of the epidemic diseases, in those countries, being very different.

The recent examples of the great mortality in hot climates, ought to draw the attention of all the commercial nations of Europe, towards the important object of preserving the health of their countrymen, whose business carries them beyond seas. Unhealthy settlements require a constant supply of people, and of course drain their mother-country of an incredible number, and some of those its most useful inhabitants. Of this the Spanish dominions abroad have furnished us with striking proofs: even at this day, many of the Spanish merchants and adventurers, who yearly

take their departure from Europe, die at Porto-bello or Carthagena, soon after their landing.

The Dutch settlements at Surinam, St. Eustatia, and Curaçoa, as well as several in the East Indies, have proved fatal in point of health to the Dutch; as have the islands of Martinico, St. Domingo, and lately the country of Guiana, to the French settlers.

Great Britain itself has its *Jamaica*; where the number of English sacrificed to the climate is hardly credible, and only to be guessed at from the common computation, that this island formerly buried to the amount of the whole number of its white inhabitants once in five years; however, it has of late become more healthy.

It is now a well known and certain truth, that of such Europeans as have fallen victims to the intemperature of foreign climates, nineteen in twenty have been cut off by fevers and fluxes: these being the prevailing and fatal diseases in unhealthy countries through all parts of the world.

In my *Essay on preserving Seamen*, I

have said, that a malignant fever of the remitting or intermitting kind, most frequently a double tertian, is the genuine produce of heat and moisture, is the autumnal fever of all hot countries, and is the epidemic disease between the tropics. To which I may add, that it is also the disease most fatal to Europeans, in all hot and unhealthy climates.

Of this sickness I shall attempt to give a clear and distinct view, together with its various symptoms and appearances, in most parts of the known world; and the influence of the climates, seasons, and various other incidents upon it; in order to ascertain the most effectual methods of preventing its attack*.

---

* It will be necessary, for the sake of perspicuity, to give an explanation of the appellations, by which the different fevers we shall have occasion to mention, have been distinguished, and in what sense they are here to be understood.

The ancient Greek and Roman physicians, denominated it an Ephemera, or Day-fever, when a fever proceeded from violent exercise, drunkenness, or the like causes; and after continuing only twenty-four hours, unattended with any bad symptoms, left the

Though a fever is so frequent and common a disease, yet there is, perhaps, no

---

patient in as perfect health as before its attack. If it continued longer than twenty-four hours, without an intermission, and unaccompanied with violent or dangerous symptoms, they called it a mild, continual fever; or a Synochus non putris: the most simple idea we can conceive of this fever, is an increased velocity of the circulation of the blood, without any remarkable diseased condition of the fluids, or of the solids of the body.

They, on the other hand, termed the fever Synochus putris, or a continual putrid fever, when the blood, or other humours of the body, were found to be in a morbid state, and the bowels perhaps affected; the symptoms, being then likewise more violent or dangerous. Those appearances, or symptoms, might either show themselves upon the patient's being first attacked, when the fever was then known to be putrid; or they might appear after a Synochus non putris had continued for some days, when it was then said to have changed its nature, and to have become a Synochus putris.

Besides these, the ancients assigned various other names to fevers, according to their different symptoms. The Causus, or ardent fever, was so denominated, from a violent scorching heat of the body, accompanied with intolerable thirst, dryness of the skin, mouth, tongue, &c. This ardent fever being most acute in its nature, often destroyed the patient

one so difficult to characterize and define by infallible criteria.

---

on the third or fourth day from its attack, and (if the true causus) seldom continued longer than the seventh day. It may be here proper to observe, that the ancients do not seem to have understood by the term putrid, when applied to a fever, that kind of putrefaction, which a dead body naturally undergoes. I am inclined to believe, that they derived the appellation, and their theory of the putrid fever, from the philosophy of Aristotle, who in one of his problems asserts, " Omnia quæ putrescunt calidiora fiunt." And hence the distinguishing characteristic of the putrid fever was, a sensation remarkably pungent and disagreeable, on touching the patient's skin.

Some modern writers have endeavoured to class continual fevers under the three denominations of, the inflammatory, the slow or nervous, and the putrid or malignant.

The first may be supposed to attend all inflammations, particularly of the membranes of the body; and to have for its inseparable symptoms, a full, quick, and sometimes an hard or oppressed pulse.

In the nervous fever the pulse is supposed to be much lower, and not so full, or hard; and while it is accompanied with but few symptoms of a violent inflammation, the nerves and brain seem principally affected.

As to the putrid or malignant fever, I have already

An increased velocity of the circulating blood has been supposed to constitute the

---

shown, whence the epithet of putrid came first to be assigned to fevers: it is often used to characterize a low fever, attended with very dangerous symptoms, and in contradistinction to the inflammatory fever.

A malignant fever is sometimes understood to denote a fever produced from a violent contagion; but more properly a fever accompanied with uncommon, violent, and dangerous symptoms. In like manner, when the small-pox has only its proper and favourable symptoms, we call it a mild small-pox; and on the contrary, when accompanied with purple spots, bloody urine, delirium, &c. we say it is a malignant small-pox. A disease or fever is also said to be malignant, when it makes its first attack with violent and dangerous or mortal symptoms; in which sense, that epithet is often used in the following sheets.

Fevers are with more propriety classed into intermitting, remitting, and continual. An intermitting fever leaves the patient free from all symptoms of the fever during its absence or intermission. A remitting fever has irregular or imperfect intermissions. A continual fever has not any perceptible intermission.

Each of these fevers, whether intermitting, remitting, or continual, may be either attended with the usual and gentle symptoms, or they may be accom-

very essence of a fever: but in some fevers, of which we shall have occasion to treat,

---

panied with violent, dangerous, and fatal symptoms, and hence be denominated malignant.

Again, in all those three kinds, if the bile, either pure or mixed, be copiously or frequently evacuated, by vomit or stool, the fever is said to be bilious; and there is sometimes a pain, attendant on that evacuation, felt on the seat of the liver.

A yellow colour of the skin is observed, not only in common intermittents, but frequently also in other fevers: sometimes denoting, as in contagious fevers, their malignant nature; at other times, as in some West Indian fevers, an universal dissolution of the blood and humours; and frequently accompanying gentle discharges of bile and a diseased liver.

Intermitting fevers are called quotidian, or tertian, according as they renew their attack every day, or every other day; and the term double tertian, as made use of in the general sense of these sheets, signifies that the patient has two fits, one commonly slighter, the other more severe, in the space of forty-eight hours.

I am sensible these definitions are liable to objections; but they will explain the terms used in this publication in the sense I wish them to be understood. The term Epidemic signifies the universality of a disease: Endemic, its constancy in a particular place: and Sporadic, its less frequent appearance.

the pulse gives no certain criterion of its nature, nor any indication of danger in the disease. In my opinion, a fever can no otherwise be defined, than as an indisposition of the body, attended commonly with an increase of heat; a thirst; often with a head-ach; more frequently with a remarkable quickness of the pulse, or at least a great change from its natural state; and, for the most part, with various other symptoms of distress; which, in a few days, terminate in a recovery, a remission, or death.

These things being explained, we have nothing farther to premise, but a suggestion of our fears—That an inexperience of foreign countries, and an ignorance of the true causes of sickness in them, prove as fatal to Europeans, as the malignant disposition of the most unwholesome climate.

ADVICE

TO

EUROPEANS.

PART I.

The Seasons of Sickness, and the Diseases incidental to Strangers, in different Parts of the World.

CHAP. I.

THE SEASONS OF SICKNESS, AND THE DISEASES, IN EUROPE AND NORTH AMERICA.

SECT. I.

Unwholesome Season in England, and the Diseases produced by it: in the Netherlands, Hungary, Campania of Rome, the Islands of Sardinia and Minorca, Gibraltar.

WE shall now enter on a survey of the various regions of the globe, and of the diseases peculiar to them; and shall begin our observations with the effects of heat and moisture in England.

The years 1765 and 1766 were distinguished by an uncommon appearance of intermitting and remitting fevers, in most parts of England. One obvious cause of them was, the unusual frequency of an unwholesome easterly wind.

An east wind in England, is often accompanied with a fog which it is said to bring

with it from the sea: but the truth of the matter is, that this wind then raises a copious vapour from water, mud, and all marshy or damp places.

I do not remember to have met with any observations made on this exhaling quality of the easterly wind, though I have been an eye-witness of it. When the wind changes to the east, the mud sometimes sends up a vapour as thick as smoke. Two fish-ponds in my neighbourhood, one of fresh, the other of salt-water, upon the approach of an easterly wind, sometimes also emit a dense vapour, as from a pot of boiling water.

In order to view this phenomenon distinctly, the person should stand at about 100 yards distant from the ponds. If the sun shines when the wind changes to the east, he will observe a constant stream of vapours rising out of the ponds, from about five to ten yards height, while the air about him remains serene. As the vapour or fog arising from other places glides along the surface of the earth, and is brought by the easterly wind to the ponds, he will still be able, for some time, to distinguish the vapours ascend-

ing perpendicularly out of the ponds, from those which are carried in an horizontal direction by the wind; especially if the sun continues to shine, though faintly.

This evaporating quality of an east wind, seems to manifest itself also by its effects, both on the thermometer and the human body. A thermometer, hung over a damp piece of ground, during the fogs or exhalations arising from it, will often indicate a degree of cold below the freezing point. There is also a chillness of the body, sensibly perceived in this situation, nearly the same as that arising from the wet floor of a chamber.

But winds are not constant in their effects: as we have sometimes warm weather with a north wind, and sometimes very little heat with a wind from the south; so the fogs attending an east wind are not constant; neither is the evaporation which we have mentioned, at all times to be perceived.

I am perfectly sensible, that there may be a deception in these matters, and that, instead of supposing the quantity of vapours exhaled to be increased by an easterly wind,

the coldness of that wind may be supposed only to condense and render visible the vapours in the air at that time. But even this supposition is liable to great objections, as our coldest north winds seldom or never produce such an effect, but are commonly attended by serene dry weather.

Let that be as it will, an east wind is usually accompanied by a cold, damp, and unwholesome vapour, which is observed to affect both animal and vegetable health, and in many places to give rise and obstinacy to intermitting fevers, as also to produce frequent relapses.

In particular spots of the low damp island of Portsea, the ague frequently prevails, and sometimes the flux, during the autumnal season; in some years they are much more frequent and violent than in others. It is observable, that their attack proves always most severe to strangers, or those who have formerly lived on a drier soil, and on a more elevated situation.

The year 1765 was remarkable, not only for the long continuance of easterly winds, but also for an excessive degree of heat,

which produced a more violent and general rage of those diseases, than had been known for many years. During the months of May, June, and July, we had seldom fewer at Haslar hospital than thirty or forty patients, labouring under regular tertian agues, with perfect intermissions. Of these, some were seized on board the guard-ships that lay in the harbour near the mud, but the greatest number were marines, who did duty at Portsmouth.

In the month of August the quicksilver in Fahrenheit's thermometer, often rose to eighty-two degrees in the middle of the day. This heat, together with the want of refreshing rains, spread the fever, increased its violence, and in many places changed its form. At Portsmouth, and throughout almost the whole island of Portsea, an alarming continual, or remitting fever, raged, which extended itself even as far as Chichester. At the same time the town of Gosport, on the opposite side of the harbour, though distant only one mile from Portsmouth, enjoyed an almost total exemption from sickness of every kind; and

in the neighbouring villages and farm-houses on that side, only a mild regular tertian ague prevailed, which however distressed whole families. The violence of a fever, with its appearances in a continued remitting or intermitting form, marked, in some measure, the nature of the soil. In Portsmouth its symptoms were bad, worse at Kingston, and still more dangerous and violent, at a place called Halfway-houses, half a mile from Portsmouth, where scarcely one in a family escaped this fever, which there generally made its first attack with a delirium. In the large suburb of Portsmouth, called the Common, it seemed to rage with more violence than in the town, some few parts excepted; but even whole streets of this suburb, together with the houses in the Dock-yard, escaped it.

The marines, who were three times a week exercised early in the morning on South-Sea Beach, from the effect of the stagnant water of an adjoining morass, suffered much. Half a dozen of them at a time were frequently taken ill in their ranks, when under arms; some were seized with

such a giddiness in the head, that they could scarcely stand; others fell down speechless, and upon recovering their senses, complained of a violent head-ach.

When such patients were received into the hospital, some few had a regular ague, but far the greater number laboured under a remitting fever, in which sometimes, indeed, there was no perceptible remission for several days. A constant pain and giddiness of the head were the most inseparable and distressing symptoms of this disease. Some were delirious, and a few vomited a quantity of bile; in all, the countenance was yellow.

A long continuance of the fever produced either a dropsy, or a jaundice, or both; even a slight attack reduced the most robust constitution to a state of extreme debility; which, together with the giddiness, continued long after the fever.

A scabby eruption now and then made its appearance on the lips, and the corners of the mouth: but dry itchy spots, over the whole body, resembling much the common itch, and seeming to partake some-

what of the nature of that disease, were more frequently observed in several patients at Portsmouth, where there was not the least reason to suspect any infection.

The universality of this fever, together with its uncommon symptoms, were at first alarming; but when the lancet was withheld, and the bark freely given in large doses, few died*. It decreased with the heat of the weather, and in the winter appeared chiefly under the form of a quartan ague. Under this form I shall have occasion to make farther mention of it in another place.

This may suffice for a brief description

---

* When the head-ach or giddiness were very violent, and the pulse neither full nor strong, I ordered a blister to the back, and endeavoured to reduce the fever into an intermitting form, by giving half a grain of tartar emetic, with a few grains of nitre, every six hours.

Thus a perfect intermission was generally obtained, and the bark was then administered without delay. Vomits were useful, as was also the tinctura sacra, given as a purgative during the remissions. A blister to the back, seldom failed to relieve the violent head-ach which afflicted the patients during the remissions of this fever.

of the autumnal fever of Great Britain, which in its utmost violence prevailed in 1765, not only in Hampshire, but in many other parts of this island, and which seemed to have been increased that year, by the unusual and excessive heat of the summer, together with an undiluted putrid moisture in the soil, and the long duration of easterly winds.

Let us now pass over to the Continent, and take a view of the state of diseases in other parts of Europe, at this season of the year. In the Low Countries, particularly Zealand, the most obstinate diseases of this kind frequently rage, and are particularly distressing to strangers.

Doctor Wind, in his translation into Dutch, of my Essay on preserving Seamen *, has among other judicious remarks, the following observation relative to what I have there said of tertian fevers.

He observes, " that at Middleburgh, " the capital of West Zealand, where his " father and himself had practised twenty-

* Aanmerking XI.

"eight years, a sickness generally reigns "towards the latter end of August, or the "beginning of September, which is always "most violent after hot summers.

"It makes its appearance after the rains, "which generally fall in the latter end of "July; the sooner it begins the longer "it continues, being checked only by the "coldness of the weather.

"Towards the end of August, and the "beginning of September, it is a continual "burning fever, attended with a vomiting "of bile, which is called the gall-sickness. "This fever, after continuing three or "four days, intermits, assumes the form "of a double tertian, and leaves the pa-"tient in a fortnight, or perhaps sooner: "strangers who have been accustomed to "breathe a dry pure air, do not recover "so quickly.

"Foreigners in indigent circumstances, "such as the Scotch and German soldiers, "who are garrisoned in the adjacent places, "are apt, after those fevers, to have a "swelling in their legs, and a dropsy; of "which many die.

"Fluxes are frequent in September and "October; towards the latter end of which "indeed the air becomes more healthy, and "then few diseases prevail. At this time, "those who have laboured under the fever "sometimes suffer a relapse; but then it is "into a simple tertian, which seldom con- "fines the patient."

The Doctor farther observes; "That "those diseases are the same with the dou- "ble tertian fevers, common between the "tropics. Such," says he, "as are seized "with the gall-sickness, have at first, some "flushes of heat over the body, a loss of "appetite, a white foul tongue, a yellow "tinge in the eyes, and a pale colour in "the lips. An emetic, administered before "the gall-disease appears, is serviceable. "Bleeding is seldom requisite, unless in "persons of a plethoric habit. The gall- "sickness is removed chiefly by cooling "medicines; but in October, the tertian "agues cannot be cured without the bark.

"Such as live well, drink wine, have "warm clothing and good lodgings, do "not suffer so much during the sickly

"season as the poor people: however, "those diseases are not infectious, and "seldom prove mortal to the natives."

The Scotch regiment in the Dutch service has, at Sluys, been known to bury their whole number in three years.

It would greatly exceed the intended length of this Essay, should I attempt to enumerate such similar diseases as prevail annually in other countries of Europe during the autumn. I have elsewhere had occasion to mention the epidemical distempers which rage in Hungary, and in the Campania of Rome, during the months of July, August, and September. The former, on account of its insalubrity, has been, with propriety, termed the grave of the Germans; and with regard to the latter, Lancisius, physician to Pope Clement the XIth, furnishes us with a very striking proof of the malignant quality of its air.

Lancisius relates, that thirty gentlemen and ladies of the first rank in Rome, having made an excursion upon a party of pleasure, towards the mouth of the Tyber, the wind suddenly shifted, and blew from

the south over the putrid marshes, when twenty-nine were immediately seized with a tertian fever, one only escaping.

But before we leave Europe, it may be proper to take a view of such diseases as prevail in unhealthy spots of its most southern parts, where the heat of the weather may be supposed to have great influence. For this purpose the island of Sardinia shall be selected; of the diseases of which I do not remember to have met with any printed account.

This island is annually visited with an epidemical sickness, which rages from June to September, and is called by the natives the intemperies. In some summers, there is a want of rain for four or five months; and then it is that this sickness exerts its utmost violence, being always more fatal in some places than in others, and particularly to strangers. Of this the English had lately a very severe proof.—In the month of August, 1758, Admiral Brodeŕick, in the Prince ship of war, anchored in the bay of Oristane, where twenty-seven of his men, sent ashore on duty, were seized with

the epidemical distemper of this island; twelve of them in particular, who had slept on shore, were brought on board delirious. All of them laboured under a low fever, attended with great oppression on the breast, and at the pit of the stomach; a constant retching, and sometimes a vomiting of bile; upon which a delirium often ensued. Those fevers changed into double tertians, and afterwards terminated in obstinate quartan agues. It is worthy of remark, that in this ship, which lay only two miles distant from the land, none were taken ill but such as had been on shore, of whom seven died. The prior of a convent, making a visit to the English officers, informed them,—that the intemperies of the island was a remitting or intermitting fever; that he himself had suffered several attacks of it, and had taken large quantities of the bark and snake-root; but had always reaped the greatest benefit from a change of air. He observed, that during those sickly months, persons of rank left their country-seats, and resided in cities; and that many poor people, especially in some

parts of the island, who could not afford to take that precaution, were annually cut off by this epidemical sickness. The remedy used by the peasants is an emetic, administered immediately upon the first attack of the disease: this they prepare for themselves, by quenching some pieces of glass, heated in the fire, in a weak wine; which, thus medicated, first acts as a vomit, and afterwards produces a copious sweat.

Sardinia was formerly so remarkable for its unwholesome air, that the Romans used to banish their criminals thither; and it is at present but thinly peopled, owing to the mortality occasioned by this annual sickness: for although it is about 140 miles long, and in several places 75 broad, yet it is computed, that the whole of its inhabitants does not exceed 250,000; an inconsiderable number, when compared with the inhabitants of the lesser, but comparatively more healthful island of Corsica, in its neighbourhood; though even there, the French lately lost a number of their troops by intermitting and remitting fevers.

As to the English possessions in the

southern parts of Europe, intermitting and remitting fevers, and the flux, are prevalent in the island of Minorca from June to November, and in some years are very obstinate. At Gibraltar the air is purer, and the situation more healthy.

SECT. II.

Of Canada, Newfoundland, Halifax, New England, Maryland, Virginia, South Carolina, Georgia, Florida, Mobile, Pensacola.

LET us now pass over to America, and observe the various diseases which attack strangers in that part of the globe. We shall begin with the more northern parts of that continent.

In Canada, since that extensive country has been in the possession of the English, our troops and settlers have been remarkably healthy, if we except the great mortality occasioned by the scurvy, in the winter of the year 1759. A surgeon who practised long at Quebec, informs me, that true pleurisies, and other inflammatory

disorders, were the genuine produce of the cold air of that climate; but that low bilious and intermitting fevers were scarcely known there.

The surprisingly healthy state of the ships' companies, who annually visit the banks of Newfoundland, and the long-continued health enjoyed by those who pass the winter at Halifax, are proofs that an intense degree of cold, properly guarded against, produces but few diseases, and scarcely ever the fevers which are the subject of this Treatise. It is a constant observation, that the men belonging to the Newfoundland fleet return every autumn to England, with more healthy and robust constitutions than they left it.

The climate of New England is similar to that of Great Britain, and its diseases the same. But travelling to the southward, in Maryland or Virginia, where the heats are greater, and the soil more moist, especially on lands not cleared, we find agues, fevers, and fluxes, very distressing to strangers; though the natives in general

are pretty healthy, and sometimes long-lived.

In South Carolina we find these diseases much more obstinate, acute, and violent. In that colony, especially in the months of July and August, during the growth of the rice, the fevers which attack strangers are very anomalous, not remitting or intermitting soon, but partaking much of the nature of those which are so fatal to the newly arrived Europeans in West Indian climates. The same may be said of Georgia and East Florida, during these two months. In West Florida, the diseases of strangers approach still nearer to those of our West Indian islands.

At Pensacola, where the soil is sandy, and quite barren, the English have suffered much by sickness: some for want of vegetables, died of the scurvy; but a far greater part of fevers. The excessive heat of the weather has sometimes produced in this place a severe fever, similar to that which in the West Indies goes under the name of the yellow fever. This, in the year

1765, proved very fatal to a regiment of soldiers sent from England, unseasoned to such climates, from the unfortunate circumstance of their being landed there in the height of the sickly season. It raged chiefly in the fort, where the air in the soldiers' barracks, being sheltered from the sea-breeze by the walls of the fort, was extremely sultry and unhealthy. And it is worthy of remark, that during the fatal rage of this fever at Pensacola, such as lived on board the ships in the harbour escaped it. Pensacola however is of late esteemed more healthy than Mobile, where intermitting fevers prevail in the months of July, August, and September. For these fevers, both in this and our other American colonies, we shall in general observe, that the bark has been found a sovereign remedy, and ought to be administered on the first remission of the fever, as on its early administration will greatly depend the preservation of the patient's constitution.

Having now advanced near the tropic, before we proceed to describe the diseases

in the West Indies, it will best suit the purpose of this Essay, and serve more fully to illustrate the nature of those diseases, that we direct our course to Africa, and afterwards to the East Indies, reserving the account of such as attack strangers in the West Indies, to the latter part of these sheets.

CHAP. II.

MOST UNWHOLESOME SEASONS, AND THE DISEASES IN AFRICA.

SECT. I.

Of Algiers, Tunis, Tripoli, Morocco, Egypt.

THE state of good health commonly enjoyed by the subjects of almost all European nations, who live in a state of slavery, in the kingdom of Algiers, Tunis, and Tripoli, and in the empire of Morocco, leaves us no room to doubt of the salubrity of the northern parts of Africa. Even the most southern districts, in the empire of Morocco, are far from being unhealthy; Europeans there not only living to a great age, but commonly enjoying good health. The healthfulness of that climate clearly appeared from the unimpaired constitutions and healthful countenances of the late crew of his Majesty's ship Litchfield, of 50 guns,

who, in the year 1758, were shipwrecked on that coast, and after remaining at Morocco upwards of seventeen months, returned to England in perfect health.

We must not, however, include Egypt among the number of the kingdoms in Africa, where Europeans enjoy such perfect health; the lower part of this country is rendered unwholesome by the annual inundation of the Nile, and the upper part being surrounded on three sides by large and extensive deserts of sand, is thereby exposed to the effects of that noisome vapour, which during the summer months, arises from sultry hot sand. The diseases produced from these causes*, are con-

* Some writers, who have attempted to account for the origin and cause of the plague in this country, do not seem to have been well acquainted with the nature of the winds and seasons in Egypt. Was it not for the inundation of the Nile, this country, in all probability, would have been rendered uninhabitable during the summer months, not on account of the filth of Grand Cairo, but on account of the hot winds from the deserts, which often begin here in the middle of April, and continue to blow for thirty or forty days. The heavy dews which then

fined to certain months, beginning in May, and commonly ceasing in September. It is during these months, but especially towards the latter end of summer, that strangers are apt to be seized with bilious disorders, fluxes, and fevers*, similar to those in the southern parts of Africa, of which we are next to treat.

---

fall in the night, serve in some measure to refresh the air; but when, by the increasing heat of the summer, the Samiel winds have acquired a pestilential violence, and a killing quality, then a sheet of water is, by the hand of Providence, spread over Egypt.

* See Prosper Alpinus, Thevenot, Bruin, Paul Lucas, and others, who have given accounts of Egypt.

SECT. II.

Of the Coast of Guinea. Its Soil, Periodical Rains, and Heat. Its healthy and sickly Seasons. Quantity and Effects of the Rains. Surprising Effects of the Harmattans. Comparative degrees of Health in the different European Settlements. Its Diseases. The Waters of the Country examined. A proposal to prevent the Guinea Worm. Whence the violence and mortality of Diseases in Guinea. A Journal kept in a Voyage to Catcheou. Medical Directions.

AFTER passing the great river Senegal, we come to Negroland, or what is commonly called Guinea. The inland parts of this country, except where the course of a few rivers has conducted the Europeans, are little known to us, being visited by no Christian travellers, but the Armenians. They are the greatest travellers in the world, and the only people known to have lately visited the inland parts of Ethiopia merely out of curiosity: but as they have published no relations of that country, Europe has reaped very little benefit by their travels. Several of them have made

their appearance at Cape Corso Castle, after having travelled through the Upper Egypt and Nubia, across the whole continent of Africa; but for want of knowing the European languages, they could not make themselves understood, further than by the draught they had made of several large cities, through which they passed.

The farthest the Europeans ever penetrated up the rivers, into this part of Africa, was, by means of the river Senegal, to the country of Galam, above 700 miles from the sea. There the French established a factory*, on account of the gold trade;

---

* Some idea may be formed of the rude state of the interior parts of Guinea in general, from the account of this factory, related to me by a medical gentleman, who accompanied the first detachment of British troops which were sent to take possession of it. Their passage from Senegal, being against the stream, was upwards of six weeks; during which time they lost in fevers more than a third of their number, and suffered exceedingly from the sultry heat and mosquittoes.

On their arrival they found a small fort, built on an eminence, at a winding of the river: the country on both sides of the river was low, and covered with thick woods, except for the space of half a mile

which with their other settlements on that river, was surrendered to the English in

---

round the fort; and on one side it was inhabited by blacks, on the other by Arabs, who, during the dry season, wandered thither with their flocks for pasturage. Here all Nature seemed to be at enmity with man. They were prevented from walking in the woods by tygers, who were so daring as often at night to attempt scaling the walls of the fort; and if by going armed or in small parties, they should escape these, yet they were exposed to the bites of venomous serpents, of different kinds, and many of a most extraordinary size: the shores of the river swarmed with crocodiles: the earth had its white ants, the air its wild bees, its sand-flies, and its mosquittoes. These insects, though not the most tremendous, were perhaps their most distressing enemies. The ants devoured almost every article either of provision or apparel; scarce any precaution could elude their art; they raised a hollow cylinder of earth perpendicularly towards their object, and through it, as by a ladder, ascended in thousands: they were one of the greatest torments to the sick of that climate, and would reach the bed in a night's time, though hung at a distance from the ground; when their bites, like scalding water poured upon the skin, were more intolerable than the disease itself. The sand-flies and mosquittoes were exceeding numerous, and would have been esteemed severe plagues, had not one yet more severe occurred, the wild bees, who swarmed in such numbers, as to

the year 1758, upon the taking of Senegal, but has since been abandoned on account of its extreme unhealthiness.

---

darken the air, and often hived in their rooms. Once or twice in a summer they were generally visited by a swarm of locusts, who came from the East like a thick cloud, and eat up every thing that was green; but this was only a temporary inconvenience, as in eight or ten days the earth was clothed with a new verdure, and the trees put forth new leaves.

The whole animal creation here attained an unusual degree of perfection. Droves of elephants, and ostriches of a large size, frequently came down to the fort: the baboons were so numerous, that they made them their principal amusement; they clothed them with the regimentals of the soldiers who died, they made them walk erect, by tying their two fore-feet behind them, and in some respects even made them serve them in their houses.

The sultry heat of the weather was almost intolerable, even the night could not be deemed cool, and, when the wind came from the desert, it scorched like a blast from the mouth of an oven. Annually the country was subject to an inundation of the river, from the heavy rains which fall periodically in that climate: these continued for several months, and laid the country for a great extent under water; when the little fort, defended by its high walls, appeared like a small island in the midst of a sea.

At a distance, this extensive coast appears in most places flat, and covered with low suspended clouds. On a nearer approach, there are generally perceived heavy dews, which fall in the night, and the land is every morning and evening wrapped up in a fog. Upon examining the face of the

---

This was the season of sickness, and it swept off near one-half their number; during it, the slightest irregularity or intemperance was productive of death; a company would one night meet and be merry, and before the next, be the greatest part of them in their graves.

The expectation of being relieved at the end of a twelvemonth, made this wretched life supportable; but unfortunately next season the mortality was so great among the soldiers sent from Senegal to relieve them, that not above three or four reached the fort alive, the rest died on their passage up the river. It was therefore impossible for the poor remains of the former garrison to quit it, and they were obliged to drag out in it another year, yet more tedious than the former; when the very few who remained alive were sent back to Senegal with ruined constitutions.

Some miners were since sent to this place from England, in order to instruct the natives in a proper method of working their gold mines; but were all cut off, partly by the natives, but mostly by the climate.

country, it is found clothed with a pleasant and perpetual verdure, but altogether uncultivated, excepting a few spots, which are generally surrounded with forests or thickets of trees, impenetrable to refreshing breezes, and fit only for the resort of wild beasts.

The soil is either marshy, or watered with rivers or rivulets, whose swampy and oozy banks are over-run with sedges, mangroves, and the most noxious weeds; the slime and filth on which sends forth an intolerable stench, especially towards the evening.

In this country, as in all others between the tropics, the sun is vertical twice a year, and on his return from the northern tropic, is generally attended with heavy and continual rains. These rains assuage the insufferable heat, and allay the pestiferous vapours which in all probability would, in many places between the tropics, arise from the ground, particularly from the sands, and by the powerful influence of a twice vertical sun, might become destructive to animal life. It appears by a late obser-

vation, that at Senegal, the most northern extremity of Guinea, in December 1763, the heat was 93 degrees, measured by Fahrenheit's thermometer, and 98 at Sierra Leona, when the sun had made its most distant retreat from those places. Hence we may in some measure judge what might be the effects of the perpendicular rays of the returning vertical sun on the already heated ground, if those countries were not sheltered from their influence by a thick clouded atmosphere, and an almost incessant rain. This, as most tropical countries, has, properly speaking, only two seasons, the wet and the dry; the former is commonly of about four months continuance, and is the season of sickness, whereas, for many months, in the dry season, most parts of this country are equally healthy and pleasant with any in the world.

As in Europe, the winter sometimes sets in sooner, sometimes later; in some years is very severe, in others mild; so in tropical countries, both the commencement of the rainy season, and the quantity of rain which falls, vary in different years. At

Senegal, the rains commence about the beginning of July, and continue till the end of October: in some seasons they appear a few weeks earlier, in others a few weeks later. At Gambia they begin about a fortnight or three weeks sooner than at Senegal; and down the coast, their commencement becomes more early in proportion as the latitude decreases.

The quantity of rain which falls during the wet season, is almost incredible. By observations made at Senegal, 115 inches depth of rain were found to fall in these four months: a quantity equal to that which falls in England during the space of four years.

It is no less remarkable, that this great change in the weather has little or no effect on the barometer. In this instrument, when in Europe, the variations of the mercurial column are about three inches; but in the torrid zone, its variations are scarce perceptible. It is there but little affected by the most violent hurricane or the heaviest rain; the quick-

silver having been seldom observed to rise above four-tenths of an inch.

There are many difficulties which occur, in assigning a satisfactory reason, why in some countries, as in those between the tropics, heavy and continual rains should produce sickness, while in other places, especially in the southern parts of Europe, a want of rain, for two or three months in summer, should have nearly the same effect, and bring on diseases almost similar.

In such an uncultivated swampy country as Guinea, one would hardly expect to hear of a season of health; but what I have asserted is an experienced fact, with respect to newly arrived Europeans. For notwithstanding such as constantly reside there, retain, through all the seasons of the year, evident marks of the insalubrity of the climate, yet the indispositions under which they labour, in the dry months, are generally the remains of their former illness, or the consequences of what their constitutions had suffered during the sickly season.

Upon this occasion I cannot help observ-

ing, that there is hardly a physical cause which can be assigned for the production of any disease, that will not admit of some exceptions: thus, not only the woods and morasses in Guinea are tolerably healthy in the dry season, if we except Old and New Calabar, Benin, and such like places; but a few instances might be produced, of towns surrounded with marshes and a foggy air, where the inhabitants suffer no inconvenience from their situation, even during the rainy season: as an example, take New Orleans in Louisiana.

Do the impetuous torrents of water poured from the clouds during the rainy seasons, in tropical countries, contain what is injurious to health? This much is certain, that in Guinea, many of the principal negroes, and especially the Molattoe-Portuguese, take the utmost precaution to avoid being wet by those rains, especially by such as fall first. At the setting in of the rainy season, they generally shut themselves up in a close well-thatched hut, where they keep a constant fire, smoke tobacco, and drink brandy, as preserva-

tives against the noxious quality of the air at that time. When wet by accident with the rain, they immediately plunge themselves into salt-water, if near it. Those natives generally bathe once a day, but never in the fresh-water rivers, when they are overflown with the rains; at such times they prefer for that purpose, the water of springs. The first rains which fall in Guinea, are commonly supposed to be the most unhealthy; they have been known, in forty-eight hours, to render the leather of the shoes quite mouldy and rotten; they stain cloths more than any other rain; and, soon after their commencement, the ground, even in places formerly dry and parched, swarms with frogs. At this time skins, part of the traffic at Senegal, quickly generate large worms, and it is remarked that the fowls, which greedily prey on other insects, refuse to feed on these. It has been farther observed, that woollen cloths, wet in those rains, and afterwards hung up to dry in the sun, have sometimes become full of maggots in a few hours.

Is the sickness of those seasons to be ascribed to the intense heat of the then almost vertical sun, which frequently, for an hour or two at noon, dispels the clouds, and with its direct beams instantly changes the refreshing coolness of the air into a heat almost insupportable?

As the season of those sudden and terrible storms called hurricanes, in the East and West Indies, and tornadoes on the coast of Guinea, partly coincides with that of the rains; do these dreadful tempests in any measure contribute to produce the sickness prevailing at those times? It was remarkable one year at Senegal, that at the beginning of the rainy season, in the night succeeding one of these tornadoes, a great number of the soldiers, and two-thirds of the English women, were taken ill; this garrison having before been uncommonly healthy.

Lastly, Is it not more probable that, as in some of these countries, the earth, for six or eight months in the year, receives no moisture from the heavens, but what falls in dews, which every night renew the

vegetation, and reinstate the delightful verdure of the grass, the surface of the ground in many places becomes hard, and incrustated with a dry scurf, which pens up the vapours below, and, by the continuance of the rains for some time, this crust is softened, and the long pent up vapours set free, which thence become the cause of sickness? That these dews do not penetrate deep into the earth, is evident, from the constant dryness and hardness of such spots of ground, in those countries, as are not covered with grass and other vegetables. The large rivers in the dry season being confined within narrow bounds, leaves a great part of their channel uncovered, which having its moisture totally exhaled, becomes a solid hard crust: no sooner the rains fall, than this long parched crust of earth and clay gradually softens, and the ground, which before had not the least smell, begins to emit a stench, which in four or five weeks becomes exceedingly noisome. At this time the sickness is generally most violent.

In the Essay on preserving Seamen, I

have already given an account of the malignant and fatal vapours called harmattans, and the seasons in which they infest some places on this coast. I have since found some persons who cannot conceive, that a vapour or a fog, should open crevices in the wood, and make the boards shrink from one another. Upon this occasion, I shall only say, that facts so well attested are too stubborn to bend to theory. A gentleman, who had long resided at Cape Coast Castle, informed me, that during the time of this fog, being in the upper chambers of the fort, the boards of the floor shrunk so much, that he could discern the candles burning in the apartments below him (there are no plaister ceilings used in those hot countries), and that he could then even distinguish what people were doing in the apartments below; the seams of the floor having opened above half an inch, while the fog lasted, which afterwards, upon its being dispelled, became close and tight as before. I have already observed, that providentially those fogs prove fatal only in

some years, and even then only in particular places.—But to return from this digression.

If, from the foregoing accounts, we form to ourselves an idea of a low, uncultivated, woody country, laid under water, at a time too, when the heat of the air far exceeds any degree of heat ever experienced in England, we shall not be surprized to find, that such as are unaccustomed to the climate, seldom escape a fit of sickness at this season. If we farther take into consideration, that the only spots of ground cleared in this country are low, damp, and annually overflown (such being only proper for cultivation of rice, the common food of the natives), and to it add the blameable inattention of the Europeans themselves to matters regarding health, the violence and mortality of their distempers will be easily accounted for.

It is not uncommon, in many trading factories, to meet with a few Europeans, pent up in a small spot of low, damp ground, so entirely surrounded with thick woods, that they can scarcely have the

benefit of walking a few hundred yards, and where there is not so much as an avenue cut through any part of the woods for the admission of wholesome and refreshing breezes. The Europeans have also unfortunately fixed some of their principal settlements on low, inland, unventilated spots, on the foul banks, or near the swampy and oozy mouths of rivers, or on salt-marshes formed by the overflowing of the ocean, where in many places the putrid fish, scattered on the shore by the negroes, emit such noisome effluvia as prove very injurious to health.

Notwithstanding what has been said, I think it will hardly admit of a doubt, that if any tract of land in Guinea was as well improved as the island of Barbadoes, and as perfectly freed from trees, underwood, marshes, &c. the air would be rendered equally healthful there, as in that pleasant West Indian island.

At present, the English settlements on the rivers Senegal and Gambia, are remarkably unhealthy; but otherwise, the northern, or what are called the windward

parts of this coast, are the most healthy, especially in places or factories near the sea. Thus the island of Goree, the town of Sierra Leona, the forts of Dixcove, Succondee, Cape Coast, and all the English, Dutch, and Danish forts on the Gold Coast, are, comparatively speaking, healthier than the country to leeward of them.

The air in Whydaw is bad, but much worse, nay in a manner pestilential to Europeans, in the Gulph of Benin, even as far as Cape Lopez. As to the Portuguese settlements to the southward of that Cape, we observe that St. Paul de Leanda, the capital of their dominions in that part of the world, is said to be tolerably healthy, considering the climate; whereas the kingdom, and especially the city of Benguela, are remarkable for a pestiferous air.

The most healthy place, or the Montpelier, for its air, of the Portuguese settlements in that division of the globe, is the town of St. Salvadore. Notwithstanding this lies 150 miles up the river Congo, or Zaire, and within six degrees of the equa-

tor, yet, from its being situated on a hill, and the neighbouring country being cleared of the natural woods and thickets, its inhabitants breathe a temperate and pure air, and are in a great measure exempted from all the plagues of an unhealthy climate.

The less dangerous diseases which attack Europeans in Guinea, are, the dry belly-ach, and the Guinea-worm, a worm which breeds in the flesh. This is a white, round, slender worm, often some yards long, lodged in the interstices of the muscles, commonly in the legs, feet, or hands: when it attempts to escape through the skin, it occasions a swelling, resembling a boil, attended with great pain, until its little black head appears in a small watery bladder, on the head of the boil. When this bladder breaks, the head of the worm is to be secured by tying it to a small roll of linen, spread with plaister; and part of the worm is once or twice a day to be gently drawn forth, with care not to break it, and wrapped round this roll, until it be brought away entire; then the ulcer

generally heals soon; but if part of the worm breaks off, the part remaining in the flesh can be ejected only by painful and tedious suppurations in different places. Dr. Rouppe observes, that the disease of the Guinea-worm is infectious. It may at least be prudent in Europeans, not to lie in the same apartments, and to avoid too free a communication with such negroes as are afflicted with them. The dry belly-ach and Guinea-worm may be observed at any season of the year, and seldom prove mortal. But the diseases most fatal to Europeans, are fluxes and fevers. The latter make their appearance in the rainy seasons.

I am informed by a surgeon, who practised some years at Senegal, that for several months during the dry season, the country was as healthy and pleasant as any in the world; but soon after the rainy season began, a low malignant fever constantly spread itself among the Europeans. It seemed to proceed from a poison, as it were, got into the stomach, beginning with severe retchings, and often with a

vomiting of bile. Upon its first attack in this way, he administered a few grains of emetic tartar, and found, if this medicine operated both upwards and downwards, it generally relieved, and often entirely abated all the symptoms: but this lucid interval continued only a short time; for commonly in six hours afterwards the fever and vomiting returned, accompanied with a delirium. The administration of a second emetic did not produce so good an effect, or a remission of the fever. A second remission was however sometimes accomplished by the Julepum è Camphorâ Pharmacopœiæ Londinensis, and the Haustus Salinus Pharmacopœiæ Pauperum Edinburgensis; then the bark was administered without delay. Those who were very plethoric were bled; but this operation gave only a momentary relief to the pains of the head and back. In some, the fever was very malignant, and the patient died soon after its attack, the corpse appearing of a yellow colour, and the skin stained with livid spots or blotches. He seldom applied blisters, until the patient was

comatose, and then he found good effects from them.

The bark ought to have been administered immediately after the first remission of the fever was procured by the vomit. A more early application of blisters, in such low fevers, is also advisable. It is worthy of remark, that the fevers of this country are particularly fatal to European women.

An inflammatory fever is seldom observed during the season of sickness, in this part of the world. The flux chiefly occurs at this time, though it may sometimes make its appearance at other seasons, and is a distemper very common, and often fatal to Europeans in Guinea. The most mortal epidemic, however, is that low malignant fever of the remitting kind, which rages only in the rainy season*.

---

* The following is an accurate description of this fever, which raged on board the Weasel sloop of war, during the rainy season at Gambia, in August, 1769, taken from the journal of the ingenious Mr. Robertson, surgeon of that ship.

The dry belly-ach is the same disease here as in the West-Indies; but the Gui-

---

"The symptoms are arranged, according as the fever appeared in a more mild or more malignant form.

"In its mildest form it began with a head-ach, a sickness at the stomach, thirst, universal uneasiness, and pain, especially in the back and loins. The pulse is small and quick, the skin hot and dry. In the morning these complaints were greatly relieved; in the evening exasperated, which happened through the whole course of the fever.

"About the third day, the violence of the symptoms increase, the tongue now becomes white and foul, the speech weak and faultering, the thirst insatiable, the pulse soft, and weaker than natural.

"On the third night, there was a gentle moisture on the skin; likewise on this night several had profuse sweats.

"On the fourth day, the patients lose the sensation of taste, and towards the evening become very hot and restless.

"On the fifth day, the weakness is increased. Hitherto the patients had not been confined to bed in the day-time.

"On the sixth, frightful dreams and an incipient delirium, prevent them from sleeping.

"On the seventh, they grow worse; their tongues are brown, dry, and chopped, the delirium is increased, with restlessness and universal uneasiness.

nea-worm seems peculiar to Africa, and a few parts of Asia. As it has been sup-

---

" On the eighth, the remissions and exasperations happen as usual.

" The ninth is the worst day; in the morning they are cool, but the symptoms soon return with increased violence.

" Their pulse, since the sixth day, has been very irregular, and in general weaker than natural.

" After this day there is a perfect remission of the fever, but towards night they become a little feverish till the seventeenth. The crisis of the fever is a gentle purging.

" In the more malignant form of the fever, all the symptoms are more violent; there is from the beginning, a great prostration of strength and spirits, universal uneasiness, giddiness, violent retchings, a strong, quick, and sometimes a hard pulse, a white and dry tongue; sometimes a severe purging with gripes; at other times a bad cough, a violent pain and stricture over the eyes, and costiveness.

" On the second day there is no alteration for the better.

" About the third day, in the morning, there is a small remission, but in the evening they again turn ill.

" On the fourth, scarce any remission could be perceived.

" When a remission happened, it did not last above three hours; the patients seemed a little

posed to proceed from a bad quality in the water of the country, I procured the

---

cooler, but their thirst was not abated, and the palms of their hands, and the soles of their feet glowed with heat. Anxiety, restlessness, and frightful dreams prevent them from sleeping. Their memory begins to fail. The tongue in a few is white and furred, in most dry and chopped. Bilious vomitings and frequent loose fetid stools have attacked several; but those who were costive in the beginning still remain so.

"Fifth, in the night several were delirious: the tongues of some are become black, and the teeth furred.

"Sixth, in the morning a few of them had a small remission, but all had been very ill in the night. The pain of the back and loins, giddiness, and a pain at the bottom of the orbit of the eyes, are still very troublesome.

"On the seventh, the delirium is more general, and in some the countenance is quite yellow, a wild look, heat of urine (not from blisters) an inclination to vomit, and loose stools, are frequent this day.

"Eighth, a few, after severe bilious vomitings and purgings, which stained like saffron, had purple blotches on the face and neck. In one patient a swelling of the parotid gland appeared. Delirium, stupor, cold sweats, convulsive tremors and catchings, twitchings of the tendons, an involuntary discharge of urine and fæces, are frequent this day. The pulse is very irregular.

waters of Senegal, Gambia, and Sierra Leon, to be sent me in bottles, well corked

---

"Ninth, all the bad symptoms continued. The blotches rose above the skin, and soon disappeared; the patients thought themselves better, while they remained on the skin. A bleeding at the nose occurred in one of them, which also tinged yellow.

"Tenth, a few had a slight remission.

"Eleventh, the dangerous symptoms continued; a large effusion of blood under the skin appeared on one patient, on the right side of the face and neck, a little before his death.

"Thirteenth, their countenances were much more yellow, and they were seized with a purging, but not attended with gripes. One of them had a gentle and universal perspiration. He was afterwards cooler, and his complaints were relieved. Among others, the bad symptoms still remained; one was seized with faintings.

"Fourteenth, the purging was attended with gripes: the patients continued cooler, but very weak, and the bad symptoms still prevailed, with the subsultus tendinum.

"Fifteenth, the bad symptoms continued; the swelling of the parotid gland in one patient was opened. Those who had the purging and yellow countenance, were better: one had the piles.

"Sixteenth and seventeenth, all continued better, except one man.

"Eighteenth, a man who, for two days, had appeared to be in a very dangerous state, fell into

and sealed, in order to examine their contents. Upon opening these bottles, I

a sound sleep, followed by an equable perspiration, which proved a happy crisis.

" In one patient the fever continued till the twenty-first day, but it had been very mild during its whole course.

" As to the critical days and symptoms that were most dangerous in this fever.

" On the third day in the evening a perfect remission was procured in one case.

" In another case a remission of thirty hours was obtained on the fifth day in the morning; but the fever afterwards returned for twelve hours with increased violence.

" On the eighth day four died, and in one a swelling of the parotid gland formed. In the mildest state of the fever, an imperfect crisis happened on this day.

" One person died on the tenth, and on the eleventh three.

" On the thirteenth one died, and many were seized with purgings, which proved a favourable crisis. In one an equable perspiration broke out, which was succeeded on the fourteenth by a gentle purging, and proved salutary.

" On the fourteenth also, another patient died, who had had bleedings at the nose, and blotches on the neck.

" On the fifteenth, the swelling of the parotid gland was ripe for opening.

found the water in all of them putrid, but the scent of the Senegal water was the

---

"On the eighteenth, the unexpected crisis happened, in a very dangerous case, by means of a sound sleep and free perspiration.

"Costiveness, frequent discharges of bile, both by stool and vomiting, bleedings from the nose, blotches, a brown, rough, and husky tongue, a smacking of the lips, wildness of the countenance, and despondency of mind, were in every case mortal. A cough proved fatal in two cases out of three, which third was the remarkable case that came to a crisis on the eighteenth day. An involuntary discharge of urine and fæces, except in two cases, was also followed by death; in the first case, there was a swelling of the parotid gland; in the second, an unexpected crisis happened on the eighteenth day. A pain either over the eyes, or deep within the orbit, faintings, drinking greedily and in large draughts, were dangerous symptoms. Upon feeling the pulse, a disagreeable sensation always remained on the fingers, especially if there was moisture on the patient's skin; but where the perspiration proved critical, this did not occur.

"Most of these patients were vomited and purged, when first taken ill. The mortality of the fever, it is supposed, was greatly lessened by the ship leaving Gambia, and being at sea. The captain, who was ill of it, took ten ounces of the bark. Hence we may in some measure judge how many pounds of that remedy would have been re-

strongest and most offensive. I could not, however, discover, by the help of a good microscope, the least appearance of any animalcules; nor did any chemical experiment discover uncommon contents or impurities in those waters. All of them, after standing for some time exposed to the open air, became perfectly sweet and good.

Hence I am inclined to think, that the putrefaction of water destroys the living animalcules and spawn, which it may contain when fresh; and if the water be permitted to putrefy, by being kept in close, clean vessels, and afterwards be sweetened, by exposure to the air, very wholesome water may be obtained in Guinea. And supposing the Guinea-worm to be generated from animalcula, or their ova, contained in the waters of the country, their production in the human body may probably be prevented, by drinking those

---

quisite in the cases of thirty or forty such patients, on board even a very small ship, and how far the allowance made to the surgeon for medicines, was adequate to this expence."

waters only, that have been rendered wholesome by undergoing a previous putrefaction and exposition to the open air.

The quickest method of sweetening such water is, by passing it through a series of vessels placed under each other, having very small holes bored in their bottoms, so that it may fall in small drops, like a gentle shower of rain, through each of them, into a receiver fixed below. The wind, or air, having thus a free passage through the water, divided into small drops, will soon render it wholesome and sweet*.

But to return from this digression: fluxes and fevers, as I said before, are the distempers most fatal to Europeans on this coast; and the season of their appearance is during the rains, and for some short time after they have ceased.

There is a pretty exact uniformity in the appearances and nature of the fevers and fluxes which attack strangers in Gui-

* This method of freshening putrid water, was first discovered by the ingenious Mr. Otsbridge, a Lieutenant in the Navy, but not before published.

nea; only their malignity or violence, and the mortality proceeding from them, in the rainy season, are in proportion to the situation of the place, and its ventilation.

The natives themselves are not exempted from those diseases. They are in general short-lived, and perceive as various degrees of purity and insalubrity of the air, in different spots of their country, as are felt in Europe, or in any other part of the world. Generally black priests, natives of the country, are hired by the Portuguese to undertake the conversion of those of their own colour, who reside in unhealthy places: hence the missions at Rio Nunes and at Gigashore have been rendered both honourable and lucrative, to such black missionaries as chose to undertake them.

We shall conclude our account of Guinea, with some extracts from the journal of the surgeon of a ship, which sailed up the rivers of that country.

"Upon the 20th of February we "sailed from Lisbon, and on the 16th of "March arrived at the island of St. Jago.

"Here we found ships of different na-" tions, whose crews, as also the white "people on the island, were perfectly "healthy. The latter, however, seemed "to have been sickly, and many of them "were afflicted with ague-cakes, or hard "swellings on the seat of the spleen.

"Upon the 5th of April we sailed up "the river Gambia, and found all the "English in the fort in perfect health. "The surgeon of the factory informed "me, that a relaxation of the stomach, "and consequently a weakened digestion, "seemed to bring on most of the diseases "so fatal to Europeans, in the sickly sea-"son. They were generally of a bilious "nature, attended with a low fever, "sometimes of a malignant, at other times "of a remittent kind. Fluxes were also "then prevalent, and often proved mor-"tal to strangers. The flux sometimes "appeared alone, at other times attended "the fever, most frequently followed it.

"Upon the 12th of April, after sailing "thirty miles up the river St. Domingo, "we came to Catchou, a town belonging

" to the Portuguese, in latitude 12 de-
" grees north. In this town there were
" only four white men, the governor and
" three friars. The number of white
" people in the trading ships were fifty-
" one. One morning, towards the latter
" end of April, a little rain fell. On the
" 13th of May, there was a second shower,
" accompanied with a tornado. On the
" 18th of May, it rained the whole day;
" and the rain continued, with but short
" intervals, until the beginning of Oc-
" tober.

" In the month of June, almost two-
" thirds of the white people were taken
" ill. Their sickness could not well be
" characterized by any denomination com-
" monly applied to fevers; it however ap-
" proached nearest to what is called a
" nervous fever, as the pulse was always
" low, and the brain and nerves seemed
" principally affected. It had also a ten-
" dency to frequent remissions. It began
" sometimes with a vomiting, but oftener
" with a delirium. Its attack was com-

"monly in the night, and the patients, "being then delirious, were apt to run "into the open air. I observed them fre- "quently recover their senses for a short "time, by means of the heavy rain, "which at that time fell upon their naked "bodies. But the delirium soon returned: "they afterwards became comatose; their "pulse sunk, and a train of nervous "symptoms followed; their skin often "became yellow; bilious vomitings and "stools were frequent. Vomits, blisters, "camphire, and the bark, were the only "things which merited the title of reme- "dies for this disease.

"The fever reduced the patient's strength "so much, that it was generally six weeks "or two months before he was able to "walk abroad. A consuming flux, a "jaundice, a dropsy, or obstructions in "the bowels, were generally the conse- "quences of it. Of fifty-one white men, "being the companies of four ships which "were at Catchou, one-third died of the "fever, and one-third more of the flux,

"and other diseases consequent upon it; "of these not one was taken ill, till after "the rains began.

"I believe, on the whole face of the "earth, there is scarce to be found a more "unhealthy country than this, during the "rainy season. The idea I then conceived "of the situation of our white people, "was by making a comparison of their "breathing such a noxious air, with a "number of river-fish put into stagnating "water, where, as the water corrupts, "the fish grow less lively, they droop, "they pine away, and many die.

"Thus, some persons became dull, in-"active, or slightly delirious at intervals, "and without being so much as confined "to their beds, they expired in that de-"lirious or comatose state, in less than "forty-eight hours after being in appa-"rent good health. The white people in "general became yellow; their stomach "could not receive much food, without "loathing and retchings. Indeed it is no "wonder, that this sickness proved so "fatal, that recoveries from it were so

" tedious, and that they were attended
" with fluxes, dropsies, the jaundice, ague-
" cakes, and other dangerous chronical
" distempers.

" It seemed more wonderful to me,
" that any white people ever recover, while
" they continue to breathe so pestiferous
" an air, as that at Catchou, during the
" rainy season.

" We were, as I have already observed,
" thirty miles distant from the sea, in a
" country altogether uncultivated, over-
" flowed with water, surrounded with
" thick, impenetrable woods, and over-
" run with slime. The air was vitiated,
" noisome, and thick, insomuch that
" lighted torches or candles burnt dim,
" and seemed ready to be extinguished;
" even the human voice lost its natural
" tone. The smell of the ground and of
" the houses was raw and offensive; the
" vapour arising from the putrid water in
" the ditches which surround the town,
" was much worse. All this however
" seemed tolerable, when compared with
" the infinite number of insects swarming

" every where, both on the ground and " in the air, which as they seemed to be " produced and cherished by the putre- " faction of the atmosphere, so they " contributed greatly to increase its im- " purity.

" The wild bees from the woods, toge- " ther with millions of ants, over-ran and " destroyed the furniture of the houses; " at the same time, swarms of cock-roaches " often darkened the air, and extinguished " even candles, in their flight; but the " greatest plague was the musquitoes and " sand-flies, whose incessant buzz, and " painful stings, were more insupportable " than any symptom of the fever.

" Besides all these, an incredible num- " ber of frogs on the banks of the river, " made such a constant and disagreeable " croaking, that nothing but being ac- " customed to such an hideous noise, " could permit the enjoyment of natural " sleep.

" In the beginning of October, as the " rains abated, the weather became very " hot; the woods were covered with

"abundance of dead frogs and other vermin, left by the recess of the river; all the mangroves and shrubs were likewise overspread with a stinking slime.—Upon our return to Lisbon, I observed the blacks suffered much from the change of climate: when they came into a cold latitude, in the month of December, many of them were seized with the flux, and other distempers, of which several died."

From all that has been observed it will clearly appear, that the most frequent and fatal diseases in the sickly season in Guinea, are not of an inflammatory nature. Indeed so much harm has been done there by the lancet, in the hands of such as have read only Sydenham's works, or authors who treat of inflammatory fevers only, that it is most advisable, for the inexperienced in such climates, to abstain altogether from its use, and to trust the safety of their patients, in such cases, to vomits and the early application of blisters, together with the use of tartarum emeticum, in small doses, or of antimonial medicines of

gentle operation, during the fever, and of the bark upon its first remission; which will be found the most successful and judicious method of treating those fevers.

In dangerous cases, the bark ought to be administered in wine, to the quantity of an ounce and a half in ten or twelve hours, and an ounce every twenty-four hours afterwards. If rejected by the mouth, it may be given in clysters in double that quantity. Here it is proper to observe, that this remedy may be administered in large quantities with the utmost safety. I have often, in England, given an ounce of it in less than six hours, even when the stomach was weak, and the patient low, without observing the least inconvenience, sickness, or retchings. I have had patients, who in less than three weeks have taken fourteen ounces of the bark in substance; and in whom there was even an absolute necessity for their taking that quantity.

It should be considered, that Dr. Sydenham's judicious practice was local; it was confined not only to England, but to

a particular and very healthy spot of it, London: and it is probable, that if the Doctor had practised at the distance of only a few miles from the metropolis, in the low grounds in its neighbourhood, he would not have found the operation of bleeding so universal a remedy for most fevers. Had this eminent physician been acquainted with the usual autumnal fever of several countries of Europe, and with the great mortality produced by it in hot climates, he would not have ventured to pronounce a continual fever of about twelve or fourteen days duration the most constant and primary fever of nature, to which the medical precepts of the ancient physicians were chiefly applicable. In this fever, after bleeding and a vomit, the safety of the patient was to be entrusted, in a great measure, to Nature, as the principal agent of the cure, which it was to effect by means of the fever itself, which was always thought the salutary instrument of a recovery; a practice and a theory by no means applicable to the fevers which attack Europeans in Guinea.

The loss of a small quantity of blood, in the beginning of a fever, does often neither good nor hurt; and there are diseases incident to Europeans in that part of the world, especially in the dry season, which may require even a repetition of that operation. But during the rainy or sickly season, in the case of Europeans labouring under the fever, it is seldom necessary to take away blood; and large and repeated bleedings are attended with fatal consequences. Nothing can be a plainer proof of the disposition of the air in this country to produce remitting and intermitting fevers, than the common observation, that those who have had obstinate agues in England or Holland, almost constantly suffer a relapse when they come on this coast.

We are sorry to say, that the sick too frequently suffer in such climates from an unskilful treatment, under the management of some who may be really ignorant, or of others so totally devoted to a particular local system of practice, as never to allow themselves either to act or think

contrary to its established rules. In this work we shall therefore endeavour to suggest some medical hints, for the information of those who have had no opportunity of acquiring experience in the treatment of the diseases of warm climates.—See Part III. Chap. I.

We take this opportunity, likewise, to inform them, that the directions here given relative to medical practice, not only on the coast of Africa, but in several other parts of the world, have been carried out of England by different gentlemen, and copies of them dispersed in several of our factories abroad; where they have been experienced and approved as the most successful methods of treating fevers. In our settlements in Africa, several copies of them are yet to be seen, transcribed from what were given to Mr. Oates and others, several years ago; and I have frequently had the satisfaction of being informed, that they are now become the standard rules of a regular and successful practice in that part of the world. Since the first editions of this Essay, the ships of war on

the Guinea station are ordered to be supplied, at the expence of Government, with a large quantity of bark, in powder, and of wine, to be issued occasionally to the men who are sent in boats, up rivers, or on shore; and instructions have been given to the commanders of these ships, not to permit any of their men to remain on shore after sun-set: two circumstances strongly recommended in the course of this work, and which, if strictly adhered to, must prove of the greatest utility.

SECT. III.

Of the Canaries, Cape de Verd Islands. The Islands of St. Thomas, Princess, Ferdinando Po, St. Helena. Cape of Good Hope. Madagascar. Mascarenhas. Mauritius. Eastern Shores of Africa.

BEFORE we take our leave of Africa, we shall take some notice of the African islands.

The Canaries are blessed with a temperate, pure, and wholesome air. No

sooner were the English officers landed there, when brought sick from Senegal, than they found an immediate and satisfactory alteration in their health. There they no longer were scorched with the fierce heat of a meridian sun, but found its warmth tempered with refreshing breezes, and a cool air; from which impenetrable surrounding woods had before debarred them. They were no longer sensible of the sudden and piercing chillness of the evenings, nor tortured with swarms of blood-sucking gnats and flies. It was surprising in how short a time they recovered their health, strength, and colour, in those delightful islands.

Passing from the Canaries to the Cape de Verds, we find St. Antonio and St. Nicholas, the only two islands in that cluster, where strangers are exempted from a general sickness during the rains. These generally begin in July, and continue till November. This sickness is still more violent in the island of St. Thomas, Princess island, and Ferdinando Po.

In the island of St. Helena, to the

southward of all these, the English planters retain their health, complexion, and a vigorous constitution, during all the seasons of the year, and live to as great an age as in Europe.

At the Cape of Good Hope, the Dutch settlements are fruitful, pleasant, and healthy. Passing these, we come to the large island of Madagascar. Here the companies of many European ships have been restored to health, when labouring under the scurvy, especially if they arrived in the dry season; but during the rains, which in general continue from November till March, this island is very unhealthy, particularly the Bay of St. Augustine and Fort Dauphin, the two places where European ships commonly anchor. The Terpsichore, an English man of war, was a melancholy example of this, which from being there during the rainy season, lost a number of her men and officers.

The same may be said of the Mascarenhas, Mauritius, and the barren island of Diego Reys. The French fort at Bourbon, is not however so unhealthy

during the rainy season, as the Bay of St. Augustine in Madagascar.

As to the eastern shores of Africa, we shall only remark, that Mozambique is reckoned unhealthy; and that the country of Quiola proved so fatal to the Portuguese, that they were obliged to abandon all their settlements upon it; but that the great city and country of Melinda are said to be tolerably healthy.

CHAP. III.

MOST UNWHOLESOME SEASONS, AND THE DISEASES IN THE EAST INDIES.

SECT. I.

Periodical Sickness in the English Factories in Arabia and Persia, &c.

IN proceeding on our course to Arabia, Persia, and India, and taking a view, as we pass along, of the principal English factories established in those countries, we find, that at Mocha in Arabia, at Bassora in the gulph of that name, and at Gambroon in Persia, the European factors are annually subject to a periodical sickness, for four months in the year, from May to September.

In the East Indies, and in the southern parts of Asia in general, we find, that the countries which are well improved by human industry and culture, such as China*,

* The numerous European factors who frequent China, suffer no inconvenience from that climate,

and several other places in that part of the world, are blessed with a temperate and pure air, favourable to the European constitution. On the other hand, the woody and uncultivated parts, such as the islands of Java, Borneo, and Sumatra, the coasts of Arakan and Pegu, the islands of Negrais, where the English lately attempted to make a settlement, Banda, one of the Dutch spice islands, and several others, have proved fatal to a multitude of Europeans and others, who have been accustomed to breathe a purer air.

In all parts of the East Indies situated near large swamps, on the muddy banks of rivers, or the foul shores of the sea, the

---

further than that, in the month of November the men in those ships which lie near to Wampoa, in the river of Canton, are subject to agues, occasioned by the north-west winds, which commonly blow at that season, and pass over some swampy rice grounds. This disease seldom proves fatal, but is apt to harass the patient for two succeeding months, if he continues on that spot. The English, whose constitutions have suffered by residing in the more unhealthy parts of India, find great benefit by being removed to Canton.

vapours exhaling from the putrid stagnated water, whether fresh or salt, from the corrupted vegetable and the other impurities, produce mortal diseases, especially during the rainy season. There is a place near Indrapour in Sumatra, where no European can venture to sleep one night on shore during the rainy season, without running the hazard of his life, or at least of a dangerous fit of sickness; and at Podang, a Dutch settlement on the same island, the air has been found so bad, that it is commonly called the Plague Coast. Here a thick pestilential vapour or fog arises after the rains, from the marshes, which destroys all the white inhabitants.

We proceed to take a general survey of the state of health, in the different European settlements in this part of the world.

SECT. II.

The four English Presidentships in India. Their comparative Degrees of Health. Diseases.

THE English have in this part of the world four presidentships or governments, to which all their other factories are subordinate, and upon which they depend: Madras, Bengal, Bombay, and Bencoolen.

The climate of Bencoolen has proved the most sickly of these, not only to the English, but to all who have been accustomed to live in a pure air. In the year 1763, upon the cession of Manilla to the Spaniards by the preceding treaty of peace, many Chinese merchants with their families quitted Manilla, in order to settle under the English government at Bencoolen: but the air of this country proved so fatal, that most of those Chinese and their families died soon after their arrival. Many English have also fallen a sacrifice to the

intemperature of this climate; and indeed very few of them survived any length of time, until they built a fort on a dry elevated situation, at the distance of about three miles from the town. It is called Fort Marlborough; where, during the rage of sickness at Bencoolen, the garrison is frequently healthy.

Bengal, next to Bencoolen, of all the English factories, proves the most fatal to Europeans. The rainy season commences at Bengal in June, and continues till October: the remainder of the year is healthy and pleasant. During the rains, this rich and fertile country is almost quite covered by the overflowing of the river Ganges, and converted as it were into a large pool of water. Diseases rage among the Europeans in the months of July, August, September, and October, attacking chiefly such as are lately arrived. Here, as in all other places, sickness is more frequent and fatal in some years than others. The distempers are fevers of the remitting or intermitting kind; sometimes they may be-

gin under a continued form, and remain several days without any perceptible remission, but they have in general a great tendency to a remission. They are commonly accompanied with violent fits of rigors or shiverings, and with discharges of bile upwards and downwards. If the season be very sickly, some are seized with a malignant fever, of which they soon die: the body is covered with blotches of a livid colour, and the corpse in a few hours turns quite black and corrupted. At this time fluxes prevail, which may be called bilious or putrid, the better to distinguish them from others which are accompanied with an inflammation of the bowels. In all those diseases at Bengal, the lancet is cautiously to be used.

It is a common observation, both at Bengal and Bencoolen, that the moon or tides have a remarkable influence there on intermitting fevers. I have been informed by a gentleman of undoubted veracity, and of great knowledge in medicine, that in fevers at Bengal, he could foretel the

precise time when the patient would expire, it being generally about the hour of low water.

Thus much is certain, that in the year 1762, after a great sickness, of which it was computed 30,000 blacks and 800 Europeans died in the province of Bengal, upon an eclipse of the moon, the English merchants and others, who had left off taking the bark, suffered a relapse. The return of this fever was so general on the day of the eclipse, that there was not the least reason to doubt of the effect*. How-

* In this sickness, a constant vomiting of a tough, white, pellucid phlegm, accompanied with a continual diarrhœa, was deemed the most mortal symptom. Bleeding was attended with fatal consequences; but the administration of the bark, upon the least remission of the fever, with its continuance for some time afterwards, was recommended to every captain and surgeon of the ships, in the river of Bengal.

All navy and other surgeons, whose ships are bound to the East Indies, should take with them ten times the usual quantity of bark, and upon this account be excused from taking other drugs, not wanted in that climate, as bark cannot be procured there, without great expence and difficulty.

ever the moon's influence may operate, these observations furnish a useful hint, which is, in such situations, to take doses of bark at the full and change of the moon, as being the seasons found there to be most dangerous for an attack or relapse into those intermitting fevers*.

---

* As no accurate account has hitherto been published of the appearance of this fever in India, I will give some ingenious observations made on it at Bengal, in 1762, by my friend Dr. Lind, now of Windsor, which will also serve to prove the great similitude of this fever with those of other hot climates. "Impetus morbi plerumque subitaneus est, et enci-"pit sensu debilitatis, ac ingenti spirituum prostra-"tione; accedunt frigiditas modo major, modo "minor, vertigo, nausea, capitis et lumborum "acerrimi dolores, manuumque tremores; vultus "est pallidus, cutis vulgo arida et constricta, oculi "languidi ac graves, celer, at exilis pulsus, anhe-"litus plerumque difficilis et singultibus inter-"ceptus.

"Progrediente paroxysmo, algores caloribus va-"gis intermiscentur; hicce calor brevi factus vio-"lentus permanet, augetur nausea, et in quibusdam "vomitus supervenit, unde magna copia bilis reji-"citur; nec raro per alvum bilis quoque dejici-"ebatur; rubescit cutis, tumidi occuli et interdum "haud parum inflammati sunt: pulsus evadit ple-

At Bombay the air is more wholesome than at Bengal; and in general the whole

---

" rior, et anhelitus difficilior, cum magna inquie-
" tudine, et siti importuna; attamen, propter nau-
" seam, potiones æger fastidit omnes; lingua fit
" sordida; ac dolores capitis et lumborum ingra-
" vescunt; delirium supervenit; lenis in facie ap-
" paret mador, qui sensim deorsum diffusus, de-
" crescente symptomatum violentia, remissionem
" instare demonstrat, eaque profusis sudoribus per-
" ficitur.

" Remittente febre, pulsus fere ad naturalem con-
" ditionem redit; manet tamen capitis atque lum-
" borum dolores, licet leviores, ut et sapor oris in-
" gratus, ac prostratus appetitus.

" Ingravescente morbo, remissionem vix notabi-
" lem mox sequebator alius paroxysmus, qui sane
" haud ita magno tremore incepit; majore tamen
" capitis dolore, summa sollicitudine, cardialgia,
" nausea, vomitu, bilisque dejectionibus; vomitus
" et dejectiones tamen plerumque albi coloris erant
" calcis aqua commistæ, vel lactis illius quod lac-
" tentes evomunt, adinstar, quando materia coagu-
" lata plurinum contrita est. Fervor, immodica
" sitis, ac deliria eveniunt. Lingua evadit squali-
" dior, ac, una cum dentibus et interiore labiorum
" parte, nigra crusta obtegitur; spiritus calet fœ-
" tetque; inchoatur de novo remissio cum sudore;
" ea tamen spatio temporis est brevior, nec æque ac
" prior conspicua.

coast of Malabar is tolerably healthy. The island of Bombay has of late been rendered

---

"Alteram hance remissionem sequitur paroxys-
"mus, in quo symptomata prioribus longe erant
"violentiora; vomitus ac dejectiones magis fœte-
"bant; lingua, dentes, ac labiorum interiora non
"modo atra integebantur crusta, verum lingua adeo
"arebat rigebatque, ut voces parum distincte effer-
"rentur; deliria gravia, inquietudo, et molestia,
"durante pyrexia, maxime fiebant; nec prius tol-
"lebantur, quam supervenerint remissio ac su-
"dores.

"Si febris ita invaluerit in tertio paroxysmo, ut
"mors sequitur, quod sæpius obtigit, nonnulli ægri
"comatosi evaserunt; in alis delirium est vehe-
"mentius. Excreta fœtida, ac haud secus quam
"cadaver olent; exonerationes sunt involuntariæ;
"pulsus celer, exiguus, et irregularis, adeo ut vix
"dinumerare aut sentire queas; gelidus toto manat
"corpore sudor, præcipue circa caput et collum;
"facies fit Hyppocratica, et convulsa; ægroti stra-
"gula carpunt, et floccos legunt; subit tendinum
"subsultus; in tergo solum recumbunt, sensim ad
"imam lecti partem dilabuntur; extremitates eva-
"dunt frigidæ ac lividæ; dein corripiuntur con-
"vulsionibus, quæ tragœdiam claudunt.

"Vis solis ac lunæ ad Bengalam mirabiliter ad
"recidivam hunc morbum perpessos proclives
"efficit; unde hanc inter causas excitantes morbe
"annumerare possumus, est enim ita insignis, ut

much more healthy than it was formerly, by a wall which is now built, to prevent

---

" ægrotus, qui octo aut decem diebus convaluit, in " summum recidivæ adductus fuerit periculum, " antequam lucidum cœli decus plenum orbem " impleat, aut sub interlunium, ni cortex Peruvi" anus inhibendi causa detur. Documenta tam " multa sunt ac res ipsa ita cunctis Bengalæ degen" tibus innotescit, ut modo dixisse sufficiat. Quos" dam ipse vidi qui nonnisi sub ipso plenilunio et " interlunio paroxysmum, et tum unicum tantum, " habuer; equi tamen facili negotio arceri potuit, " si cortex Peruvianus paucos dies ante expectatum " accessionis tempus exhibitus, ac usque quo illud " sit elapsum continuatus fuerit, in hujuscemodi " casu febricitanti cuidam puero mauro ipse sa" nantes porrigebam manus, morbum usque ad " quatuor paroxysmos quovis plenilunio et inter" lunio tuto redeuntes permisi, ut prius rem ipsam " exploratum haberem, quam corticem coercentem " admoverem.

" Nov. 16. Cal. Ann. 1762. Tempore pome" ridiano, solem haud parum lumine defectum vi" dimus; ac cum antea sub serena cœli facie, ex " nimis æstu laboramus, mox inter maximam ob" scurationem aër multum algebat. Tunc tempo" ris remittens febris, qua tenebatur D. Macquire " á præfecto in concilio tertius, subeunte solis de" fectu, exacerbata est; eodem vero transeunte, " evanuit. Ægroti vero qui tum nostra sub cura " erant non admodum afficiebantur.

the encroachment of the sea, where it formed a salt marsh, and by an order, that none of the natives should manure their cocoa-nut trees with putrid fish. The rains begin here sometimes in May, but more frequently in June, and for four months are very violent.

At Surat and Tellicherry, on the same coast, Europeans commonly enjoy a good state of health.

Madras is the most healthy government belonging to the English: and in general the air of the whole coast of Coromandel is pure and salubrious, in respect of most other parts of India. This is fully evinced

---

" Subitos ac violentos lunæ effectus tem præ-
" cipue observavimus quarto nonas Novembris,
" hora circiter secunda matutina, quo tempore
" terra interposita radios intercepit solares; in eo
" temporis articulo haud pauciores octo nautarum
" ex nave Drake, qui ad Calcuttam in ædibus
" præfecti navis ex febribus convalescebant, eodem
" fere temporis puncto, vehementissimo paroxysmo
" sunt correpti; et idem plurimis evenit qui in
" nave fuere collegæ nostri curæ demandati."
Diff. Inaug. Med. De Febre Putrida in Bengalia, Ann. 1762. *Aut* Jac. Lind.

by the good health Europeans enjoy, not only at Madras, but at St. David's, Cuddalore, Masulipatam, Visagapatnam, and at Negapatnam, the Dutch presidentship on this coast. The rains do not begin on this coast until October, and continue during the months of November and December. The more violent the rains are, the shorter is their duration. The quantity of rain, however, which falls at Madras, is considerably less than what falls either in Bengal or on the coast of Malabar.

SECT. III.

The Settlements of other European Nations in India. Medical Directions. Mr. Ives's curious Observations made in a Journey from India to Europe by land.

Manilla, in the island of Luconia, on account of the purity and healthy temperature of its air, may justly be reckoned the Montpelier of all the settlements established by European nations in that quar-

ter of the globe: but even this, during some months of the year, is unhealthy.

The Danish settlement at Tranquebar is healthy, as evidently appears from the florid countenance of the Danes in that place.

Pondicherry, the capital of the French, in India, is far from being unhealthy. Goa, the residence of the Portuguese viceroy in India, is tolerably healthy. Batavia, the capital of the Dutch dominions, is annually subject to a fatal and consuming sickness.

From familiar observation, the fatal errors committed by the young and thoughtless, cease to excite our wonder; but we are apt to be struck with astonishment, when we find that the founders of great towns, and the governors of extensive provinces, through ignorance or mistake, have exposed populous and magnificent cities to an annual and pestilential destruction. This seems to be the case with Batavia; the Dutch, in endeavouring to make this their capital in India to resemble their cities in Europe, have

adorned it with canals or ditches intersecting each other, and running through every part of it. Those canals filled with water, may serve for some use, or perhaps ornament; but notwithstanding the utmost care to keep them clean, in the hot and unwholesome climate of Java, during and after the rainy season, they become extremely noxious to the inhabitants, and more particularly to strangers. The unwholesome air of that place alone has cut off more Europeans than have fallen by the sword in all the bloody wars carried on by the Dutch in that part of the world. In June the rains begin; in July and the succeeding months sickness rages most.

It is remarkable, that in the war which terminated in 1763, the English ships of war which touched at Batavia, suffered more by the malignant diseases of that climate, than they did in any other part of India, if we except a fatal scurvy which once raged in that fleet at sea. Soon after the capture of Manilla, the Falmouth, a ship of 50 guns, went to Batavia, where

she remained from the latter end of July to the latter end of January; during which time she buried seventy-five of her crew, and one hundred soldiers of the 79th regiment, who were embarked on board her; not one person in the ship having escaped a fit of sickness except her commander, Captain Brereton. The Panther, a ship of 60 guns, was there in the years 1762 and 1764, both times, unhappily, during the rainy season. In the year 1762 she buried seventy of her men, and had ninety-two of them very ill when she left the place. In the year 1764, during a short stay, she buried twenty-five of her men. The Medway, which was then in company with her, lost also a great number of men.

The fever was of the remitting kind. Some were seized suddenly with a delirium, and died in the first fit; none survived the attack of a third fit. The surgeon of the Panther imputes his preservation to taking as much of the bark every hour, in claret wine, as his stomach would bear, beginning the use of this remedy immediately upon the first remission of the fever. We

may form some idea of the Dutch practice in this part of the world, when we find that, by the advice of four of their physicians, the bark was administered to Captain Matheson, of the Panther, notwithstanding a remission of his fever could not be procured; such was their confidence in that medicine. But that gentleman, with many of his men, fell a sacrifice to the intemperature of the climate. Nor was the sickness at that time confined to the ships; the whole city afforded a scene of disease and death: streets crowded with funerals, bells tolling from morning to night, and horses jaded with dragging the dead in hearses to their graves. At that time, a slight cut of the skin, the least scratch of a nail, or the most inconsiderable wound, turned quickly into a putrid spreading ulcer, which in twenty-four hours consumed the flesh, even to the bone. This fact is so extraordinary, that upon a single testimony credit would hardly be given to it; yet on board the Medway and Panther, they had the most fatal experience of it, and suffered much from it.

Besides malignant and remitting fevers, which rage during the wet season, and for some time after it, in the unhealthy parts of India, Europeans, especially such as live intemperately, are also subject to fluxes, and to an inflammation or disease of the liver. This last is almost peculiar to India, and principally to the Coromandel coast.

Fluxes are seldom in India accompanied with inflammatory symptoms, the discharges being chiefly of a putrid or bilious nature. They are removed by administering a vomit, then rhubarb, and afterwards ipecacuanha, in small doses; and when the bile and other putrescent humours have been thus sufficiently evacuated, opiates, with a diet of rice, and such food as is antiseptic.

The disease of the liver is generally preceded by a high fever, a difficulty of breathing, and a violent pain fixed in the right side, upon the seat of the liver, to which the sick person often applies his hand, seeking for relief. On its first attack, the patient should lose blood, and

the part should be bathed with a warm, relaxing, and discutient fomentation; or a blister may be applied to it. When, by bleeding, the fever is somewhat abated, and a gentle purge or clyster has been administered, immediate recourse must be had to mercury, as a specific for this disease. A gentle salivation of fifteen or twenty days continuance, must be raised by means of mercurial ointment rubbed upon or near the affected part, together with the use of mercurial pills, or calomel, taken occasionally. The livers of those who die of this disease are found in a putrid state, resembling an honey-comb. I gave mercurials with good effect to a number of patients under my care, who came from the East-Indies, and who suffered from a return of this disease, when in England. In three cases, where mercury was not administered, the liver came to a suppuration, of which two of the patients died. The use of mercury in such cases may appear empirical, but by the experience of all who have practised physic in

India, it has been approved as a safe and excellent method of cure.

Sailors who do not eat green vegetables, are apt to be likewise afflicted in India with the scurvy, and with scorbutic fluxes; for the cure of which, see my Treatise on the Scurvy. They are also very subject in the East as well as in the West-Indies, to large and obstinate ulcers of the legs*.

---

* I have been favoured with the following ingenious observations by Dr. Bogue, of Titchfield.

" The diseases most fatal at Calcutta, while I " was there, in 1757, began with the rainy season, " and were obstinate putrid intermitting fevers. " The cold fit, which was excessively violent, con- " tinued often for twelve hours; and as the fever " returned every day, the patients had not above " four or five hours respite from it. During the " rains, and for some time after, we had sick, at " the same time, in this place, one half of the men " in the squadron under the command of the Ad- " mirals Watson and Pococke. Out of three ships " of the line, and a twenty-gun ship, and those " not fully manned, we lost in six months upwards " of 200 men, most of whom died of these fevers.

" Camphire was found the best medicine in the " fit. Bark and other antiseptics were admini- " stered in large quantities, after first giving an " emetic, and emptying the bowels. This fever

In India, the European women in general enjoy a much better state of health

---

"reduced the patients in general to such a weak "state, that Mr. Ives, then surgeon of that hospital, judged it absolutely necessary to give "arrack in their boiled rice to those who were "on the recovery, or who had not the disorder in "a violent degree. He likewise generously supplied them with Madeira wine.

"In the inflammatory fevers preceding the "rainy season, bleeding with caution was found "of service; but as soon as the rainy season set in, "the lancet was seldom or never used.

"A salivation generally cured the disease of the "liver, if the spitting was brought on before matter was formed. In some the mercury produced "a looseness, which also cured the patient. In "inflammations of the liver, when it adhered to "the peritoneum, which was generally the case, "and a tumor appeared externally, it was several times opened with success.—Of which the "following is an instance.

"A seaman, aged about thirty-five years, was "sent very ill of the scurvy, in the end of May, "1759, to his Majesty's hospital, under my care "in the absence of the surgeon, at Negapatnam, "a Dutch settlement on the Coromandel coast. "Soon after his coming on shore he was seized "with a scorbutic flux, and a few days afterwards "complained of a pain in his right side. In

than the men. Child-bearing is, however, peculiarly fatal to them at Calcutta; on

---

"these circumstances, as the flux continued, and "several livid scorbutic spots had appeared on his "limbs, with a contraction of both knees, I judged "it improper to give mercurials; so that a large "tumor shewed itself on that side, pointing ex-"ternally, with matter beginning to form. I for-"warded the suppuration with poultices; and on "the 13th of July, in the cool of the evening, "being about a month after his first complaining "of the pain of that side, I laid the tumor open "about six inches, and let out near three pints of "well digested matter. I then introduced my "hand into the left lobe of the liver, which I found "almost entirely suppurated, and containing se-"veral honey-comb cavities, the edge of the liver "adhering to the peritoneum. He was dispirited "on the thoughts of its being opened, but bore the "operation better than could be expected in that "low state to which he was reduced. I cautiously "filled the cavity with dry soft lint, and gave him "a julep, with the tincture of bark, to take fre-"quently. Next morning after the operation there "was a large discharge of good matter, and I found "one sinus leading obliquely down towards the "navel, and another towards the back, each about "two inches in length. I laid them both open to "the bottom; and these were the only openings "I had occasion to make, though I found another "sinus leading towards the chest. That day I

which account it would be advisable for them to retire to a more healthy situation at the approach of their delivery.

"dressed him as before, and the next day, after "having fomented, I threw into the cavity an in-"jection of barley-water, and tincture of myrrh, "which I repeated three or four times, until I "thought the parts were sufficiently cleansed of "matter. I continued to dress with lint, prefer-"ably to any other application, on account of its "giving no uneasiness, and of its absorbing qua-"lity. I gave him the bark in substance as soon "as his stomach would bear it. During the first "fortnight I dressed him twice a day, there being "then a great discharge. The cavity afterwards "filling up fast, and the quantity of matter les-"sening, he was dressed only once in twenty-four "hours, but still continued to take the bark. In "three weeks the wound was not more than an inch "deep, and but two inches in length, florid gra-"nulations daily forming; and towards the end of "August, the parts being almost cicatrised, the "patient was sent on board his ship to do duty, "the Admiral expecting every day to meet the "French squadron. He was killed on the 10th of "September following, in the action between the "English squadron commanded by Admiral Po-"cocke, and the French by Count D'Ache.

"In some of those whose liver came to a suppu-"ration, I have known instances where the matter

Before we leave India, we shall give some account of the settlement which

---

"has been so acrid, as not only to corrode, but to "dissolve the cartilages at the extremities of the "false ribs, and likewise part of those ribs.

"The following observations were made on the "bodies of two persons who died of this disease, "after the liver had suppurated. In a man aged "60, I laid open about seven inches in length of a "very large tumor, of the right lobe of the liver, "pointing externally, and let out at least two "quarts of fœtid matter. I treated it much in the "same manner as the preceding case, and fo the "space of one month, not without great hopes of "a cure, though the incarnation was always more "slow than in the other patient. He was seized "with a flux, that continued more or less until his "death, which happened in five months after the "opening of this tumor. During the last four "months, the appearances frequently varied; "sometimes they flattered, but not to so great a "degree as before he was seized with the flux. "The aliment was discharged undigested through "the ulcer, a little before he died; and on opening "the dead body, I found the right lobe of the liver "almost entirely consumed, the remains adhering "in part to the stomach, in which there was an "opening equal to a half-crown piece, and through "it the food had passed to the liver. The left lobe "was a little enlarged, and all the bowels of the "abdomen were in an inflamed state.

the English lately attempted at Balambangan.

"In the patient of another surgeon, upon open-
" ing the thorax, the lower part of the right lobe
" of the lungs was found slightly adhering to the
" diaphragm, and its blood vessels full and en-
" larged; the upper part of that lobe, together
" with the left lobe of the lungs and the heart, were
" all in a sound state. Upon inspecting the ab-
" domen, that part of the right lobe of the liver
" which lies contiguous to the ribs, was almost
" entirely suppurated through its whole substance,
" as far as the diaphragm: where it had not sup-
" purated, the blood vessels were most of them
" ruptured. On introducing the hand between
" the peritoneum and liver, there issued from two
" large abscesses, three pints at least of a crude
" sanious matter. The right lobe extended itself
" into the cavity of the breast of that side, quite
" to the third true rib. The gall-bladder was in a
" healthy state, and full of bile; the ductus com-
" munis cholidochus was wholly free from obstruc-
" tions; but the omentum was partly mortified.
" The stomach was sound, but much distended
" with wind, and the vessels on the intestines in a
" state of plenitude. The kidnies, spleen, mesen-
" tery, and pancreas, were perfectly sound."

This gentleman again visited India in the year 1772, where he had, for three years, the superintendance of the naval hospitals. He is so obliging

Balambangan is a small island about forty-five miles in circumference, which lies to the westward of Borneo, and is covered with sand and swamps. It remained uninhabited until the year 1773, when it was ceded to the English by the sultan of Sooloo, in lieu of a debt he owed the East-India Company. A governor, council, and proper establishment of officers were then sent thither, with a detachment of European troops and sepoys for their defence: a colony of Malays from Bencoolen, and another of Chinese, were also induced to settle there. For a few months

as farther to inform me, that when he was last in India, mercury was more in use on the Coromandel coast than it had ever been before. In bilious fluxes, when the common remedies failed, it was used with great success, either by unction or internally, obstructions in some of the viscera being then supposed to be the cause of the disease. Fluxes of long standing were seldom cured without it. In all bilious complaints, emetics were not so frequently given as formerly, being only intended to cleanse the stomach, but the greatest dependence was placed on mercurials, and purges given at a few days intermission, which was supposed to be the most natural method of carrying off the bile.

these people continued in perfect health, but no sooner did the monsoon change, than sickness made its appearance; and it raged with such violence, that scarce one in ten survived this monsoon. A large ship was sent to the settlement to be used as a floating factory, but was brought into a close harbour, where in respect of health it could be of no benefit. The seasons of health and sickness, are here regulated by the direction of the wind or monsoon: from October till April, during the north-east monsoon, the wind comes from the sea, and the settlement is perfectly healthy; but from April till October, during the south-west monsoon, the wind blows over the marshes both of this island and Borneo, and produces fevers of a most malignant nature, which frequently cut off even the stoutest men in twelve or fourteen hours. Notwithstanding this island lies within ten degrees of the equator, yet it is not subject to the periodical rains which happen in Bengal, and upon the Coromandel coast; twice a year only, in April and October, at the change of the

monsoons, the weather is variable for about a fortnight, during which great storms of wind and heavy showers of rain are frequent. Sickness generally begins in eight or ten days after the weather has become variable, and even before the wind is fixed in the south-west quarter: it reigns with equal violence in every part of that monsoon; and the sun, though twice vertical in that period, seems in no respect to increase its malignity.

In December 1773, the Royal Captain, a Company's ship, which had been sent from China, with provisions and necessaries for this settlement, was shipwrecked on the coast of Palloan, about eighty leagues distant from it. The crew went in their boats to Balambangan; and in about two months afterwards, the Captain, with forty-two of the men, embarked for England, leaving behind him on this island forty-three of the officers and men. The English and Malays had taken possession of the island about a fortnight before their arrival, but by the loss of this ship were deprived of all their supplies: however,

until April they suffered no inconvenience, but what scarcity of provisions and want of necessaries must naturally cause in an infant colony; all remained in perfect health, not one died: upon the change of the monsoon in April, sickness suddenly appeared, and during the course of this monsoon it made such a rapid progress, that of the sixty-three officers and men who were left behind of the crew of the Royal Captain, one only survived, Mr. Saunders, from whom I received this account; and he was distressed with a severe flux, which obliged him to go to China in September, for the recovery of his health, which he obtained at sea upon his passage, even though the same monsoon continued. He left, indeed, three or four of that unfortunate ship's crew alive, but these he was informed afterwards died before the monsoon changed. All the council were dead before he left the settlement, except the governor, Mr. Herbert, who had resided upwards of thirty years in India, and long in the most unhealthy parts of it, at Batavia and Bencoolen. Not above five

or six remained of the detachment of the European troops, which had been sent there; and the sepoys, Chinese, and Malays, died in equal proportion with them. During this monsoon, such was the malignant disposition of the air, that no wound would heal; even the slightest cut, or a mosquittoe bite, when scratched, degenerated into a large ulcer; whereas during the north-east monsoon, wounds easily healed: one gentleman even had his arm amputated during that monsoon, and quickly cured; an operation which, during the other, must have cost him his life.

We shall conclude this cursory account of the diseases in the East Indies, and of the comparative degrees of health enjoyed by Europeans in different parts of it, with a few extracts from Mr. Ives's accurate observations, made on his travels from India to Europe by land; this gentleman having for three years been surgeon to his Majesty's naval hospital in the East Indies.

" After leaving the unhealthy kingdom
" of Bengal, we arrived, on the 9th

"of March, 1758, at Gambroon in "Persia.

"The climate here is very unhealthy. "Few Europeans escape being seized with "putrid intermitting fevers, which rage "from May to September, and are often "followed with obstructions in the liver.

"Mr. Parker, surgeon to this factory, "is much esteemed for his medical know-"ledge. He has been so successful in "practice, that the English, during his "residence among them for two years "past, have buried only one of their "number. His method of treating those "fevers is, after the administration of an "emetic, to order two scruples of the "bark, twelve grains of the salt of worm-"wood, and twelve grains of the powder "of snake-root, to be taken every hour. "Seven or eight doses of this medicine "effectually prevented the return of the "fit; and a repetition of them within six "or eight days after, secured the patient "against any relapse.

"Various authors who have treated of

" Gambroon, do, as well as the present
" English factory, impute its unhealthful-
" ness during the summer months, to the
" noxious effluvia with which the air is
" contaminated, from the great quantities
" of blubber-fish left by the sea upon the
" shore, which very soon become highly
" putrid and offensive.

" Upon the 30th of March we came to
" the island of Karec, in the Persian gulph.
" Mynheer Tullick, surgeon to this Dutch
" factory, informed me, that in the rainy
" seasons, intermitting fevers and fluxes
" are the usual distempers.

" After sailing up the river Tigris from
" Bassora, we arrived at Bagdat. In
" this city, supposed to contain 500,000
" souls, a purple fever then raged; but
" though it was computed that an eighth
" part of the inhabitants were ill, yet the
" distemper was far from being mortal.
" Here we were informed, that the Arabs
" had broken down the banks of the river
" near Bassora, with a design to cover
" with water the desarts in its neighbour-
" hood. This, it seems, is the usual me-

" thod of revenge taken by the Arabs, for
" any injury done them by the Turks in
" Bassora; and was represented to us as
" an act of the most shocking barbarity,
" since a general consuming sickness would
" undoubtedly be the consequence. This
" was the case fifteen years before, when
" the Arabs, by demolishing the banks of
" this river, laid the environs of Bassora
" under water. The stagnating and pu-
" trifying water in the adjacent country,
" and the great quantity of dead and cor-
" rupted fish at that time lying upon the
" shore, polluted the whole atmosphere,
" and produced a putrid and mortal fever.
" Of this fever between 12 and 14,000 of
" the inhabitants died; at the same time
" not above two or three of the Europeans
" who were settled there escaped with
" life: so dreadful are the effects of cor-
" rupt stagnating waters in such sultry
" climates! A Bashaw was lately dispatched
" to Bassora, to use his utmost endea-
" vours to prevent this calamity, by re-
" pairing the banks, and by preserving

" the course of the river within its pro-
" per channel.

" Towards the end of May we found
" the heat of Bagdat excessive, and al-
" most intolerable to our European con-
" stitutions. We were advised by our
" friends to remain there until the month
" of October. They represented to us
" the increasing heat of the weather, and
" the violence of it in the desarts of
" Arabia; but particularly the danger in
" passing the desart, of meeting with that
" pestiferous and mortal blast, called the
" Samiel.

" This is a sudden gust of wind, to
" which travellers are exposed in the de-
" sarts, sometimes towards the middle or
" the end of June, but more frequently
" in the months of July and August;
" when it brings instantaneous death to
" every man or beast that happens to stand
" with his face towards it. Providen-
" tially, however, a certain though short
" warning of its approach is given, by a
" sensible alteration of the air. When

" this is perceived, all travellers, with " their horses, camels, &c. must lie prostrate upon the ground, with their faces " downwards, and their feet towards the " Samiel, and continue in that posture " until it is passed, which is the only " means of safety. This pestiferous vapour quickly passes, and commonly " does not expand itself far, but runs as " it were in streams of no great breadth; " so that travellers, at a few miles distance " from each other, are exposed to different " Samiels, and some may be so fortunate " as to escape them. The Samiels may " be in some measure shunned, by travelling only in the night during those " months in which they occur.

" To avoid the great desart, when we " left Bagdat, we took the road to Mosul, and on the 5th of July arrived at " that city. Here I learned from a Carmelite friar, who acted as physician to " the Bashaw, that the common diseases " were ardent fevers and dysenteries in " the summer, and intermitting fevers " during the wet season. I understood

" from him, that bilious obstructions and " swellings of the liver were as frequent " here as in India. This place had lately " contained 300,000 inhabitants; but a " famine, and the sickness which followed " it, had greatly reduced the number.

" In our journey we passed through " Nizabin, a place remarkable for its bad " air and bad water; which the same " famine and sickness had almost depo- " pulated.

" After undergoing many difficulties, " we at length, on the 5th of August, ar- " rived at Aleppo*. As we performed " this long journey in the warmest months " of the year, I shall now relate what " effect the intolerable heats had upon our " constitutions.

" They produced an entire loss of ap- " petite, a faintness and gripes, with fre- " quent and bilious stools, which greatly " exhausted our strength. My stomach " was often so weak, that it could receive " only a little milk. Several of us became

* For the diseases frequent in this place, see Dr. Russell's Treatise on that subject.

" feverish through the excessive heat, and
" were obliged to have recourse to gentle
" vomits; sometimes, with good effect,
" to Dr. James's powders, to take off the
" fever; and to small doses of calomel and
" rhubarb, to cleanse the bowels from a
" sharp and acrid bile. Though we were
" furnished with the most ample conve-
" niences for travelling, which money or
" the strongest recommendations to the
" principal Christians, as well as Maho-
" metan chiefs, could procure, and had
" laid in a quantity of excellent Madeira,
" claret, and provisions, &c. &c. yet
" most of us suffered in our constitutions
" by this long and fatiguing journey.

" Such as travel this way in the sultry
" season, should set out early in the
" morning, or rather travel only in the
" night; and always, if possible, in a co-
" vered litter, called a Tackaravan.

" Travellers should seek for repose dur-
" ing the heat of the day, in a hut, or
" house if it can be had, well sheltered
" with a close thick roof; or they should
" endeavour, if possible, to sleep near the

" bank of a river, in which case, a single " tent, not painted, will afford an abode " the most commodious, next to that of " a house, if the canvas be kept con- " stantly wet by the servants, from trenches " full of water cut round it.

" We found lemonade, made with the " extract or juice of lemons, the most " grateful and cooling drink during the " sultry heats of the day; but a glass of " strong wine was absolutely requisite in " the evening, to repair our exhausted " strength and spirits. The stomach should " never be oppressed with full meals.

" The traveller should not forget to " provide himself with some alum, as the " water of the Euphrates and the Tigris, " though wholesome, is apt to be muddy. " We added a quarter of an ounce of " powdered alum to six or seven gallons " of water, and in about an hour and a " half afterwards the water became quite " pure and transparent. We found no " inconvenience from the alum; and I am " inclined to think alum is not only an " excellent purifier of thick muddy wa-

"ter, but that in hot climates it cools "the body, and braces up its relaxed "fibres*."

Mr. Ives having, since the first editions of this Essay, published an account of his voyage to India and journey home by land, we may now refer the reader for further particulars to the work itself; where he will find many entertaining relations, and several excellent medical observations.

Since the second edition of this Essay, Dr. Clark, of Newcastle, formerly surgeon of the Talbot Indiaman, has published a book, entitled, Observations on the Diseases in long Voyages to hot Climates, and particularly on those which prevail in the East Indies. It is chiefly a medical journal kept in two voyages to India. The principal result of the author's

* It is a practice with some apothecaries, to put a small quantity of alum in their distilled simple waters when foul, which quickly renders them clear and transparent. Though this makes the water somewhat hard, yet the small quantity requisite for the purpose does not seem to make common water harder than Bristol water, so much esteemed in Jamaica, and other hot countries.

experience during these voyages is, that the bark may be given with advantage in the malignant and remitting fevers in India, not only during remissions, but even during the exacerbations of the fever, and where the fever is continual.

A very accurate journal, kept on a similar plan, by Dr. Robertson, formerly surgeon of the Rainbow ship of war, during several voyages to the Coast of Guinea, has also lately been presented to the public. It contains a faithful account of the diseases of that coast. Some extracts taken from it, when in manuscript, are given in the preceding pages.

CHAP. IV.

MOST UNWHOLESOME SEASONS, AND THE DISEASES IN THE WEST INDIES.

SECT. 1.

Comparative Degrees of Health in the English Settlements; in the French, the Dutch, the Spanish.

WE shall conclude this part of our subject with some observations on the West Indies, and an account of the diseases most common and fatal to Europeans, on their first arrival in that quarter of the globe.

The most healthy of all the English possessions in this part of the world, is the island of Bermudas; next to which is the island of Barbadoes, if we except that spot of ground upon which Bridge-town, its capital, is situated. The air in many parts of St. Christopher's is also pure. That of Antigua is bad: and that of Jamaica is

reckoned still more unhealthy; though much less so than it formerly was. The colour of the European inhabitants in the island of Montserrat, is a proof of the salubrity of its air: the same may be said of Nevis. In general, the rainy season in those islands happens in August, September, October, and November. In the situations lately pitched upon, for the principal English settlements on Grenada, the Grenadines, and particularly at Tobago, we are sorry to observe the health of the inhabitants has been a point little attended to. In the island of St. Vincent, the town of Kingston is rendered very unhealthy by an adjoining morass. It is to be hoped, that these new settlements will become more healthy, when the stagnating water is drained off; an effect which the heat of the sun itself would in some places produce, if the woods were cut down.

With respect to the settlements of other European nations, we shall briefly observe, that the French settlement of Cayenne has proved very sickly. The climate of St. Domingo is also unhealthy; that of Mar-

tinico less so. At Guadaloupe, Martinico, and most of the other French West India islands, there are low, swampy grounds, commonly called Basse Terre, which are particularly unhealthy, and parcelled out to such poor and indigent foreigners, as will run the risk of their health and lives in improving them.

The Dutch settlements at Surinam, St. Eustatia, and Curaçoa, are all very unhealthy.

In different parts of the Spanish West India dominions, the air varies greatly in point of purity, according to the situation of places. Thus the city of Mexico is very healthy, while La Vera Cruz, its sea-port, is remarkable for bad air. It is observed, that in the West Indies the periodical rains, and the sickness which attends them, are much more violent in the hot, marshy, woody, and uncultivated places, upon the continent, than upon the adjacent islands; the inland provinces are, however, found to be in general more healthy than the sea-coast. Were we to take a survey of the whole coast of the

Spanish continent in the Bay of Mexico, we should find few sea-port towns or rivers, during the rainy season tolerably healthy*.

Shoals of large and ravenous sharks crowding into the harbours, a dark thick cloud to the southward, with thunder and lightning, slowly approaching, foretel the coming on of the sickly season, and are the awful preludes of those impetuous torrents, which in a few days burst from the clouds, and cover with water the whole face of the country. These rains, by their continuance, so swell the numerous rivers, that the waters of the sea are thereby rendered fresh for several miles, and muddy, almost to the distance of ten leagues from the shore.

Some of the harbours in the Bay of Mexico, and those generally the most secure, prove fatal to Europeans, besides the usual causes of sickness, from want of a

---

* We shall have occasion afterwards to mention many large and extensive provinces in the West Indies, which are blessed with a pure and wholesome air.

due ventilation. Thus in Port Maho, near the island of Rattuan, ships lie in a bason of water so environed with high mountains, that the wind can have no access to them; in this respect, they suffer more than even at English Harbour in Antigua. The stagnated air thence becomes so unwholesome, that men, after being there a few days, are suddenly seized with violent vomitings, head-achs, deliriums, &c. and in two or three days more, the dissolved mass of blood issues from every pore. In such places, the water of the sea itself would probably become putrid, and destructive to the very fish, was it not kept in motion, by a gentle flux and reflux, which may be perceived every day.

The Bay of Honduras and the Mosquittoe shore, although very unhealthy, are far better than Carpenter's River and Rio Morte, or the River of Death, in the Gulph of Mexico. This last was so named by the Spaniards, from the death of all of that nation who at different times have attempted to make a settlement upon it; the English however have since, by settling

on a different spot of ground, been more fortunate, and call it the New River.

It is a general observation, that women enjoy a much better state of health in the West Indies, than men, and are not so subject to the yellow fever as them, owing probably to their more temperate way of living.

ECT. II.

Diseases of the West Indies. Account of the Yellow Fever; that Disease shewn to be the common West India Fever in a virulent degree; a Disease similar to it at Cadiz. The French and Dutch Accounts of the Diseases in the West Indies. The dreadful Mortality occasioned by them among the English at Bastimentos, Carthagena, and the Havannah.

In the West Indies, as in other unhealthy climates, fevers and fluxes are fatal to Europeans. The disease which is commonly called the yellow fever, is particularly destructive to them.

Having considered this disease with at-

tention, I am now* of opinion,—That the remarkable dissolution of the blood, the violent hæmorrhages, the black vomit, and the other symptoms which characterize the yellow fever, are only accidental appearances in the common fever of the West Indies. They are to be esteemed merely as adventitious, in the same manner as purple spots and bloody urine are in the small-pox, or as an hiccup in the dysentery; like these, they only appear when the disease is accompanied with a high degree of malignity, and therefore always indicate great danger. They in general proceed from intense heat and a peculiar unhealthfulness of the air, though a gross habit of body, excessive drinking of spirituous liquors, and being overheated in the sun, may perhaps sometimes dispose to them.

The following observations, made by Dr. Wind, will serve to illustrate what I have advanced.

"The Middleburgh, a Dutch ship of "war, sailed from the Texel in Holland,

* See my Essay on preserving Seamen.

" on the 25th of December, 1750, and on
" the 12th of March, 1751, entered the
" harbour of Curaçoa, with a healthy
" ship's company; one only having died
" during their passage from Europe. The
" air at Curaçoa was foggy and moist,
" and the weather excessively hot; so
" that in the beginning of April two very
" bad diseases distressed the crew: a pu-
" trid dysentery, attended with great pain,
" stench, and hiccup; and also a violent
" fever, accompanied with the black vo-
" mit.

" They sailed on a cruize the 17th of
" April. The weather at sea was then
" moist and rainy: the diseases still conti-
" nued, but not in so violent a degree as
" in the harbour. Those who laboured
" under the dysentery, were not at sea
" attacked with the hiccup, and its other
" bad symptoms: neither did the black
" vomit seize those who had the fever, as
" when in the harbour.

" None of those taken ill at sea died of
" either of these distempers: but when
" the ship returned into the harbour, in

" the latter end of April, the former dan-
" gerous symptoms returned; the hiccup
" attended the dysentery, and the black
" vomit accompanied the fever; the num-
" ber of the sick was greatly increased,
" and several of them died."

I am very sensible that one or two persons may sometimes be seized with the yellow fever, when no other person in the neighbourhood labours under it; and even that at such a time its most mortal symptom, the black vomit, may attack a person newly arrived, without any previous complaint. But from thence we can only infer, that a person may be suddenly seized with the worst symptoms of a malignant fever during a very healthy season.

This happens daily in all parts of the world. Nothing is more common than a person being attacked with an obstinate ague or flux, in the most healthy seasons and countries; and patients are often afflicted with a petechial fever, when it cannot be attributed to contagion. But such cases are not the present object of our at-

tention, as we treat only of epidemic sickness from general causes.

I have perused many English accounts, both in manuscript and print, of this fever, in most of which the authors have agreed only in the common epithet of yellow, from the skin's being frequently tinged with that colour. But the same appearance is also usual in most intermitting fevers, in some contagious fevers, and in many other fevers; so cannot properly be a distinguishing mark of this.

This fever* has been supposed by some to have been first imported to the West-Indies by a ship from Siam; an opinion truly chimerical; as similar diseases have made their appearance not only in the East and West Indies, but in some of the southern parts of Europe, during a season when the air was intensely hot and unwholesome. This happened at Cadiz in Spain, in the months of September and October, 1764, when excessive heat and

* See several particulars relative to this fever, and the method of treating it, in Part III. Chap. I.

want of rain for some months, gave rise to violent, epidemic, bilious disorders, resembling those of the West Indies, of which an hundred persons often died in a day. At this time, the winds blew mostly from the south, and after sun-set there fell an unusual and very heavy dew.

This disease began commonly with alternate slight chills and heats, nausea, pains of the head, of the back, of the loins, and at the pit of the stomach. These symptoms were often followed, in less than twenty-four hours, with violent retchings, and a vomiting of a green or yellow bile, the smell of which was very offensive. Some threw up an humour black as ink, and died soon after in violent convulsions, and in a cold sweat. The pulse was sometimes sunk, sometimes quick, often varying. After the first day, the surface of the body was generally either cold, or dry and parched. The head-ach and stupor often ended in a furious delirium, which proved quickly fatal. The dead bodies having been examined, by order of the court of Madrid, the stomach, mesentery,

and intestines were found covered with gangrenous spots. The orifice of the stomach appeared to have been greatly affected, the spots upon it being ulcerated. The liver and lungs were both of a putrid colour and texture. The stomach contained a quantity of an atribilious liquor, which, when poured on the ground, produced a sensible effervescence; and when mixed with spirit of vitriol, a violent ebullition. The dead bodies turned so quickly putrid, that at the end of six hours their stench was intolerable, and in some of them, worms were found already lodged in the stomach.

His Majesty's ship the Tweed being at that time in Cadiz bay, several of her men were taken ill when on shore; but by being carried on board, all of them recovered. Neither did the black vomit, or any other deadly symptom of that fever, make its appearance in any of the ships. The dread of this distemper forced many people of fashion to retire into the country; where they remained in perfect safety from it.

Physicians of other countries, such as the French and Dutch, gave various names to the West India fevers; neither do they agree in assigning the same names, even to the same distempers.

Two French physicians, who both practised in the island of St. Domingo, have lately published an account of the diseases prevalent in that island*. The first, Dr. Chevalier, informs us, that almost all Europeans who come to St. Domingo, not only from Europe, but from North America, are, soon after their arrival, attacked with a malignant fever, formerly called Maladie de Siam, which differs from the autumnal fever usual in France, only in being a more violent and a more dangerous sickness. A later physician, Dr. Poissonniere, who practised three years in that island, says, the most frequent and fatal fevers, which attack Europeans newly arrived at St. Domingo, are either the true Causus, or ardent fever, in a violent de-

* Lettres sur les Maladies de St. Domingue, par Chevalier, M. D. &c. Traité des Fievres de l'Isle de St. Domingue, par Poissonniere Desperieres, M.D.

gree; or another distemper which is still the Causus, or ardent fever, but in a less dangerous form. Both these French authors agree, that the air of this island is healthy to the natives, and to such Europeans as have been seasoned to the climate. But they do not seem to have had proper opportunities of observing the worst symptoms, which attend the distempers so peculiarly fatal to Europeans, on their arrival in the West Indies.

Dr. Rouppe, a Dutch physician, has, in my opinion, furnished us with the best description of these diseases, as they appeared, when raging with their utmost violence, in a Dutch ship of war, at the island of Curaçoa, and has assigned the most proper epithets for them, viz. colliquative, putrid, and spotted fevers, the cholera, and dysentery; or, as we may otherwise translate them, malignant fevers, violent bilious disorders or the black vomit, and the bloody flux. I have in a note given his own words, as no account can be more full and clear*.

* Anno 1760, primo die Augusti, ad insulam S. Eustachii appulimus . . . . Die undecimo ejusdem

There is a large field for medical observations, during a very sickly season in

---

mensis, ad insulam Curaçoa direximus iter . . . . . . Die decimo nono, portum Curaçoa intravimus, et tunc viginti ægrotaverunt; inter quos nonnulli capitis doloribus sine febre, nonnulli vero colica biliosa laboraverunt, sed levi cura in pristinam sanitatem restitui poterant. Rouppe de Morb. Navigant. pag. 68, 69.

In initio commorationis, (apud insulam Curaçoa) uti supra diximus, morbi, qui maxime occurrebant, fuerunt capitis dolores, colicæ biliosæ, sanationem facile admittentes; hæ vero mutabantur in cholericas affectiones, primis longe graviores, periculosioresque, quibus mire, excruciabantur ægri. Inceperunt autem cum ingenti ardore circa præcordia, alvi torminibus, miro angore, et inquietudine, quæ subsequebantur biliosæ dejectiones, tam per superiora quam per inferiora, cum ingenti virium prostratione; multi sudore perfundebantur frigido; hæc si perrexerint, imprimis si simul febris accesserit, quemadmodum in nonnullis contigit, cum pulsu magno, qui utplurimum per decem circiter horas permansit, intumescere tunc inceperunt labia, facies, lurida evasit; remittente dein febre sanguinem fuscum sat copiose vomitu rejecerunt, et hi fere omnes obierunt, et quidam paucis horis post hujus symptomatis apparitionem: nonnulli eandem materiam, sed nigriorem, tetrumque spargentem odorem, alvo excernebant, sed malum sanationem admisit; simile quid in quibusdam contigit, qui febre

the West Indies, when thousands of Europeans are sent thither at once, as during

---

afficiebantur, licet dejectiones non urserint. Alios assueto modo incessit biliosa febris et quantum videre potui, hi maxime fuerunt juvenes, vel mediæ ætatis, robusti, et ante morbum alacres; cum ardore nempe circa præcordia, bilis vomitu, vel vomendi conatu, et siti fere inextinguibili; quidam horum in principio levibus frigoris, et caloris vicissitudinibus afficiebantur; dein subsequebator urens in toto corpore calor, cum pulsu magno, pleno, et celeri; lingua fuit, subflava, albicans, sæpius limbo viridi in margine cincta, madida semper mansit.

Pergente morbo, in nonnullis secundo, in aliis tertio die, sponte, minuebatur calor, et pulsus naturalis ex improviso reddebatur, qui sensim, sensimque minor evasit, et tandem parvus, et tremulus; apparentibus in nonnullis petechiis, imprimis circa pectus, brachia, et internam femorum partem, in nonnullis magnas lividas vidi maculas; hæc autem fiebant cum tanta virium prostratione, ut ægri minimo motu in animi deliquium caderent; sudor præterea copiosissimus in toto corpore suboriebatur; ægri insuper anxii, inquieti, leviter delirantes, admodum incuriosi, nihil æstimantes, nihilque querantes, evaserunt; attamen ad quæsita fere semper recte responderunt. In nonnullis, decidente pulsu, suboriebatur ingens circa præcordia ardor, labia leviter intumescebant, facies evasit lurida, brevi post accedebat vomitus fuscæ materiei, et tandem mors: alii

war in that part of the world. The memorable destruction of Admiral Hosier's squa-

---

ardore, et alvi torminibus divexabantur atque tetrum subnigricantem sanguinem alvo ejecerunt. In nonnullis secundo, in aliis tertio vel quarto die, flavescere inceperent oculorum album, et cutis, quod mali fuit ominis. Lingua insuper de die in diem albidior, et tandem tremula evasit, semper in dorso jacuerunt ægri. Sic autem purgente morbo, nonnunquam secundo, vel tertio, sed utplurimum quarto die accedebat tranquilla mors. . . . . . Sanguis, in calore febris vena emissus, læte rubebat, concrevit, serumque separavit, uti in Europa, subflavum; qui vero vi morbi restiterint, et quintum aut septimum diem attigerint, utplurimum furunculis vel pustulis parvis rubris dolentibus, admodum difficile in suppurationem abeuntibus, variolarum confluentium adinstar, fere in toto corpore tegebantur. . . . . . Tandem maxima ægrotantium pars, imprimis, qui trigesimum prætergressi fuerunt annum, et quibus mali corporis habitus erat, dum morbo corripiebantur, conquesta est de dolore et ardore circa præcordia, cum vomendi conatu; sed pauci vomuerunt, pulsus in nonnullis per aliquot horas increvit, sed brevi iterum naturali similis factus est, et dein parvus: cutis calor naturalis fuit, lingua madida, et alba; copiosus sudor, primo jam morbi die, in toto corpore prorupit, nullæ tamen apparuerunt maculæ. Ii, quibus sudor parvus aut nullus erat, copiosis nigris, et fœtidissimis dejec-

dron, at the Bastimentos, was begun by the scurvy, and completed by the malignant fever and flux. In the year 1741, no sooner had the rainy season set in at Carthagena, where the English troops lay encamped, than the same diseases appear-

---

tionibus, cum alvi torminibus vexabantur, insuper lipothymiis quam frequentissime corripiebantur: si vero evacuationes hæ parum cessabant, aut notabiliter minuebantur, et sudor copiosior non evasit, tunc admodum angebantur ægri; hic autem si copiosius prorupit, longe melius se habuerunt: tandem in omnibus pertinacissime, ab initio ad finem usque, permanserunt vigiliæ. Juvenis 18 circiter annorum mane bene se habuit, verum circa horam decimam matutanim de capitis dolore et cæteris febricitantium symptomatibus conquestus, pulsum magnum, plenum, et celerem habuit, secundo die, ad vesperam, sanguinem fuscum vomitu copiose ejecit: tertio autem obiit. Alius, 16 annos natus, vesperi bene se habuit, mane alterius die, in strato sensuum expers inveniebatur; corpus examinavi, quod subtumidulum, maculis lividis conspersum, pulsu fere in toto carens inveni; insuper prodibat ipsa sanguis ex aure sinistra, naribusque nigerrimus, gustu subdulcis, qui aliquot horas post mortem fluere perrexit; cadaver vero brevi in integrum livescebat, et tetrum halitum emisit.

Rouppe de Morb. Navigant. pag. 304, et seq.

ed, and were remarkably malignant, became contagious, and destroyed the greatest part of the army; the poor remains of which were afterwards almost totally cut off, in the sickly season, upon the island of Cuba.

But as the Havannah is not quite so unhealthy as either Carthagena or Curaçoa, so in the expedition to that part of the world, in 1762, the diseases which harassed the English troops, during the sickly season, though rendered very mortal, from want of good water and from other circumstances, were in general less violent and malignant than those which raged at Carthagena.

The following is an extract from a letter I received from a gentleman on that expedition, dated 24th of October, 1762.

"I think myself extremely happy in
" being among the number of the living,
" considering the deplorable condition we
" are now in. You will hardly believe
" me, when I tell you, that I have only
" 33 men of my company now alive, out
" of 100 when I landed. Our regiment

"has lost 8 officers, and 500 men. They
"mostly died of fluxes and intermitting
"fevers, the general diseases here. The
"other regiments have lost in proportion.
"We are now very sickly, as you may
"imagine, when out of 17 battalions here,
"we cannot muster 600 men fit for duty.
"The appearance of this country is most
"beautiful, and its natural advantages are
"many; yet a man's life in it is ex-
"tremely uncertain, as many are in health
"one morning, and dead before the next."

END OF PART I.

PART II.

Advice to Europeans, for the Preservation of Health in hot Climates.

CHAP. I.

ADVICE FOR THE PRESERVATION OF EUROPEANS RESIDENT NEAR THE SEA.

SECT. I.

Signs of an unhealthy Country. Of the hot Land-winds.

BEFORE giving directions for the preservation of Europeans in unhealthy countries, it will be proper to enumerate the most certain signs or proofs of an unhealthy country.

The first proof of an unhealthy country, is a sudden and great alteration in the air at sun-set, from intolerable heat to a chilling cold. This is perceived as soon as the sun is set, and for the most part is accompanied with a very heavy dew. It shows an unhealthy, swampy soil, the nature of which is such, that no sooner the sun-beams are withdrawn, than the vapour

emitted from it renders the air raw, damp, and chilling, in the most sultry climates; so that even under the equator, in some unhealthy places, the night air is cold to an European constitution.

The second is, thick noisome fogs, arising chiefly after sun-set, from the vallies, and particularly from the mud, slime, or other impurities. In hot countries, the scent of these fogs may be compared to that of a new-cleaned ditch.—Diseases therefore, arising from this cause, generally take place in the night, or before sun-rising.

The third is, numerous swarms of flies, gnats, and other insects, which attend stagnated air, and unhealthy places covered with wood.

The fourth is, when all butcher's meat soon corrupts, and in a few hours becomes full of maggots; when metals are quickly corroded on being exposed to the open air; and when a corpse becomes intolerably offensive in less than six hours. These are proofs of a close, hot, and unwholesome spot. In such places, during exces-

sive heats and great calms, it is not altogether uncommon, especially for such Europeans as are of a gross habit of body, to be seized at once with the most alarming and fatal symptoms of what is called the yellow fever, without even any previous complaint of sickness, or other symptoms of the disease. There has first been perceived an uneasy itching sensation commonly in the legs, and upon pulling down the stockings, streams of thin dissolved blood followed: a ghastly yellow colour quickly diffused itself over the whole body; and the patient has been carried off in less than forty-eight hours.

The fifth is, a sort of sandy soil, commonly a small, loose, white sand, such as that at Pensacola, Whydah, and the island of Bonavista, which is found by experience to be injurious to health.

The pestiferous vapour arising during the summer months, in the heat of the day, from such a sandy soil, is best characterized by its effects in the extensive desarts of Asia and Africa. It there constitutes what is called the Samiel-wind,

a blast, which in the parched désart proves instantly fatal both to man and beast; but when it passes over a soil covered with grass and vegetables, has its effects greatly mitigated; it is however even then productive of sickness: thus the southerly winds, while they blow from the desarts of Lybia, during the summer, at Algiers, Tunis, and Tripoli, produce an unhealthy season. And at Madras, the winds which in the months of April and May pass over a large tract of sand, are always hot, disagreeable, and unwholesome.

During these land-winds, sudden gusts of a more hot and suffocating nature are often observed to come from those sands, once or twice, or even more frequently in a day, which seem to be this vapour in a purer form. These gusts pass very quickly, and affect persons who happen to be standing with their faces towards them, in the same manner as the hot air which issues from a burning furnace, or from a heated oven, and obliges them immediately to turn from it, in order to recover breath. The effect of this hot suffocating blast or

vapour on the human body, even when mitigated by passing through a moist atmosphere, is the same as that of intense cold; it shuts up every pore of the skin, and entirely stops the perspiration of such as are exposed to it. They come only in the day-time, and always from the desarts.

Water is the only known antidote or corrector of this vapour; hence coarse thick cloths, kept constantly wet, and hung up at the windows or doors, greatly mitigate its violence. A house so built as to have no doors or windows fronting the desarts, affords also an excellent protection against its pernicious effects. The hot land-winds constantly blow at Madras and other places on the coast of Coromandel, at that season, from midnight till noon; the sea-breezes then begin, which relieve the difficulty in breathing, and the obstructed perspiration which the former occasioned.

That the heat of those land-winds, as also of the sudden gusts which accompany them, proceed from large tracts of sands being heated by the sun, is evident from

the increased heat and suffocating quality of those winds in proportion as the day advances, and as the heat of the season increases.

The opposite qualities of the winds, blowing from each side of the Balagate mountains, are a farther proof of this. These mountains, running from north to south, divide the hither peninsula of India into two unequal parts, and separate what is called the Malabar from the Coromandel coast. To the former they are very near, but at a great distance from the latter. The winds blowing from these hills, are on the Malabar coast always remarkably cool; but on the coast of Coromandel, in the months of April, May, June, and July, are extremely hot and suffocating, as they pass over a large tract of intermediate sand, heated during those months by an almost vertical sun. Hence the Malabar coast is always clothed with an agreeable verdure; whereas the Coromandel coast, during the continuance of those hot winds, seems a barren wilderness, nothing appearing green except the trees.

On the contrary, the winds that pass over those sands, after being wet with the rains, are the coldest which blow at Madras.

Bottles of liquor, inclosed in bags of coarse cloth kept constantly wet, and suspended in the shade, where those hot winds may have free access to them, become as cold as if they had been immersed in a solution of nitre. This phenomenon has occasioned much speculation, and has been accounted a surprising effect, peculiar to these hot winds; but it is, in my opinion, owing merely to the constant evaporation of the water from the sides of the bottle.

It is an observation of the natives on the coast of Coromandel, which is confirmed by the experience of many Europeans, that the longer the hot land-winds blow, the healthier are the ensuing months; these winds, as they express it, purifying the air. Are not the winds, therefore, the cause why the air on the coast of Coromandel, except during their continuance, is more healthy than in other parts of India, where

these winds do not blow? Does not this also suggest a very probable reason why the plague in Egypt generally ceases in the beginning of June? The periodical hot-winds, which come from the desarts of Nubia and Ethiopia, having then rendered the air of Egypt pure and wholesome. Many have ascribed that effect to the north winds, as the plague not only ceases when they blow, but all infected goods, household furniture, and wearing apparel, are then said to become entirely free from the contagion; these, however, cannot be the cause, as the most destructive plague is abated in its violence, if not wholly eradicated, before they set in. With equal propriety we may reject the opinion, that the overflowing of the Nile is productive of that salutary effect, as the plague generally ceases before the increase of that river is perceptible.

Thus the plague, the greatest calamity which can afflict mankind, seems to be destroyed by those hot winds, which are otherwise so pernicious to animal and vegetable life. And although, during the

continuance of these winds, the most fruitful fields wear the aspect of a parched desart, yet no sooner the rains fall, but vegetation is restored, the plants revive, and a beautiful verdure is again spread over the face of the refreshed country. In Egypt, where it seldom rains, the same effect is produced by the overflowing of the waters of the Nile.

SECT. II.

Employments which prove most fatal to Europeans, in hot and unwholesome Climates.

It will next be proper, for the benefit of those who only visit, but do not mean to reside in foreign climates, to point out some employments, which are of such a nature, as cannot well be performed in hot and unhealthy countries by Europeans, especially by such as are lately arrived, without imminent danger of their health and lives.

The first is that of cutting down woods,

or clearing the ground from trees, shrubs, &c. I could produce many instances of the fatality of this employment, but shall here mention only two.

At the conclusion of the late peace, the captain of a ship of war went on shore at the island of Dominica, with twelve of his men, to cut down the wood and clear a piece of ground, which he intended to have purchased; but in a few days, sickness obliged him to desist from this dangerous work, the captain and eleven of his men being seized with violent fevers, which terminated in obstinate intermittents, and of which several died. The survivors suffered so much in their constitutions, that even after they came to England, the return of an east wind was apt to bring on a violent fit of the ague. The Ludlow Castle, a ship of war of 40 guns, in a late voyage to the coast of Guinea, also lost twenty-five of her men at Sierra Leona, who were employed in cutting wood for the ship.

This is an occupation which has often proved destructive to Europeans in those

climates, and in which they ought never to be employed, especially during the rainy season. There are numberless instances of white persons, when cutting down the woods at that season, who have been taken ill in the morning and dead before night. The extreme danger of this work at such a time, would even render it a proper punishment for such convicts as were saved from the gallows for this purpose. If the purchasing of negroes on the coast of Guinea can be justified, it must be from the absolute necessity of employing them in such services as this is. It does not seem consistent with British humanity, to assign such employments to a regiment of gallant soldiers, or to a company of brave seamen.

Another evil, less known and less suspected, but no less dangerous, is the sending of Europeans in open boats, after sun-set, where the soil is swampy, or where there are great night fogs.

The duty alone of fetching fresh-killed butcher's meat at night, for the use of our ships' companies in the East and West

Indies, has destroyed every year several hundred seamen. In those parts of the world, butcher's meat must be brought on board at night, immediately after it is killed, otherwise it will not be fit for use the next day; but surely a contract for sending it on board at that season, might be made with the natives for a trifling sum of money; and it ought to be considered, that this trifling sum is advanced for the preservation of many lives.

During the sickly season at Batavia, a boat belonging to the Medway, which attended on shore every night, was three times successively manned, not one having survived that service. They were all taken ill in the night, when on shore, or when returning on board; so that the officers were at length obliged to employ none but the natives of the country on that business.

Great numbers of men have perished from being employed in this manner at Bengal, where the European ships often anchor in the most unhealthy parts of the river; and even when the great night

fogs arise, after the rainy season, the men are often obliged to perform such night services in boats.

Now, since it is so dangerous for Europeans in unhealthy countries, particularly during a season of sickness, to be exposed in an open boat to the foggy night air; it must appear, that sending them unsheltered, in open boats far up rivers, in unhealthy southern climates, for the sake of wood, water, trade, or other purposes, must be attended with the most destructive and fatal consequences.

The best preservative against the mischievous impressions of a putrid fog, or of a marshy exhalation, is a close, sheltered, and covered place; such as the lower apartments in a ship, or a house in which there are no doors or windows facing the swamps. If in such places a fire be kept, either in the chambers or at the doors and other inlets to a house, as is practised in some unhealthy countries, during their rainy or noisome foggy season, it will prove an excellent and effectual protection against the injuries of a bad air: on board of ships

fires may be made at the hatchways. Of many examples which might be offered to prove this, I shall only give one.

When the Edgar, a ship of war of 60 guns, was upon the coast of Guinea, in the year 1765, her men were very sickly, and many of them died; whereas it was observed, that in a sloop of war, which was constantly in company with her, few were taken ill, and not one died during the whole voyage. This could be ascribed to no other cause, but that in the sloop the fire-place for cooking victuals was on the same level with the deck upon which the men lay; and every morning, when the fire was lighted, especially when there was but little wind, the smoke from the cook-room spread itself over the ship, particularly over those parts where the men lay; but from the construction of the fire-place in the Edgar, no smoke from it ever came between her decks.

Persons on board any ship whatever, are much safer than those who make distant inland incursions in small boats upon the rivers in unhealthy tropical countries.

These are also, for the most part, totally ignorant of the sources of the diseases and deaths which surround them. The intolerable scorching heat at noon often obliges such persons to go half naked, their clothing being almost insupportable; while a free and plentiful perspiration issues from every pore. In the day-time the swampy shores emit a smell resembling that of putrid carrion; and a near approach to such putrid swamps, is then apt to produce an immediate sickness, a vomiting, and afterwards a low nervous fever*. But if they happen to pass them at night, or

* In such circumstances, a vomit taken immediately, and a change into a pure air, will often prevent a fit of sickness.

A company of gentlemen belonging to his Majesty's ship the Phœnix, taking the diversion of hunting and shooting at the mouth of the river Gambia, by following their game into a large swamp, were all of them taken ill. They were immediately seized with a sickness, head-ach, and a constant hawking and spitting, from the disagreeable smell which (as they expressed it) seemed to remain in their mouth and throat. Upon returning to the ship, each of them was ordered a vomit, which immediately removed all their complaints.

lie near them in an open boat, the air from those swamps is perceived to be quite chill and cold; insomuch that warm thick clothing becomes absolutely requisite, to guard the body against the impressions of so great an alteration in the air, and of its cold and inclement quality. The smell of the swamps, and the vapour arising from them at this time, resemble the unwholesome scent of a ditch lately cleaned; and the effect upon the most healthy and vigorous constitution, is often a chilling cold fit of an ague, terminating in a fever, with delirium, bilious vomitings, a flux, or even death itself.

I hope what has been said on this subject, will serve to excite some tender feelings of humanity in such as have the direction of our trade and ships abroad; as nothing can be more inhumane than sending unseasoned Europeans high up, from the mouths of rivers, into an uncultivated country, especially during the rainy season, and where there is no shelter from the pestiferous night air*. This practice

* It may be here expected, that where such duties are unavoidable, those who undertake them

is the more inexcusable, as the points gained by it may generally be accomplished by other means.

---

ought to be furnished with some precepts for their preservation.

I would advise all who are employed in cutting down woods, or in other laborious and dangerous services in hot climates, during the heat of the day, to have their head covered with a bladder dipt in vinegar, and to wash their mouths often with vinegar; never to swallow their spittle, but rather to chew a little rhubarb, or some other bitter, and spit it out frequently; to stop their nostrils with a small piece of linen or tow, dipped in camphorated vinegar; and to infuse some bark, garlic, and rhubarb in brandy, of which a dram is to be taken either by itself or diluted with water, morning and evening.

In the evening, before sun-set, they should leave off work, and not return to their labour in the morning till the sun has dispersed the unwholesome dews and vapours. For their safety during the night, they should retire to a close hut, as the dews may penetrate a tent; here, in the absence of the sun, a constant fire should be kept; or if that be found impracticable, the apartment in which they lie should be well fumigated with gunpowder, as fire and smoke will afford them the most excellent defence against the noxious and dangerous qualities of the night air. The smoking of tobacco in their huts, and chewing of garlic, and not sleeping

If it be done for the sake of wood, water, or other necessaries of life, there are few places in the world, where these cannot be brought into a fort, factory, or ship, by the natives, and persons perfectly seasoned to the country.

If it be done for the sake of trade, might not this be effected with equal advantage, by having the trading boats or vessels managed by the natives; who are generally much better acquainted with the navigation of the rivers in their own country than

---

on the ground, are circumstances which will also contribute to their preservation.

If, from a neglect of these precautions, the nocturnal chill fog has made an impression upon the body, a vomit should immediately be administered near a good fire, and a plentiful sweat excited after it, which will often prevent fatal consequences. If any symptoms of a low fever still continue, as a head-ach, a sickness at the stomach, chills, &c. a blister ought immediately to be applied, as these complaints, though seemingly so slight as not to confine the patient to his bed, are deceitful, and often terminate in a fatal malignant fever. If this fever can be brought to intermit, let the bark be immediately taken, to the quantity of a quarter of an ounce, or more, in red wine, every two hours, and the patient quickly removed into a better air.

strangers are?—And in this case an honest native factor, or at least one or two white people, long seasoned to the climate, will be sufficient to superintend the cargo.

Upon the whole, if all ships of war and others bound to the East and West Indies, were permitted, on their arrival in those parts of the world, to enter, as part of their complement, from ten to twenty blacks, or natives, to be solely employed in such duties as have been mentioned, it would undoubtedly be a means of saving the lives of many Europeans. Such may be entered on board as are fishermen by profession, or who are dextrous in the management of small vessels and boats. Thus, for example, at Jamaica, the proprietors would willingly permit the slaves to serve on board the king's ships, in the West Indies, for any length of time, provided their wages were paid to their masters. And those negroes being deprived of the means of debauchery and riot, which our seamen, when on shore, are apt to fall into, the duties of wooding and watering the ship, and all the services required of boats

at night, would, in all probability, be more speedily and faithfully executed.

Burying the dead in swampy countries, is another occupation which has proved fatal to many, and which ought also to be entrusted to negroes, or the natives of the country. The effluvia from ground newly opened, whether from graves or ditches, are far more dangerous than from the same swampy soil when the surface is undisturbed; nay, in some places, it has been found to be almost certain death for an European to dig a grave, unless long seasoned to the country. In such a place, the attendance of friends at funerals ought to be dispensed with.

I am sensible, that it is not uncommon to meet with gentlemen who have been long in the East and West Indies, who treat all the apprehensions of sickness in those climates as imaginary, and the precautions against them as needless and chimerical. It is probable they might never have been employed in such services as I have mentioned, or have not resided much, during the sickly seasons, in very unhealthy

places. If, notwithstanding these, they have been so fortunate as to enjoy good health, which many have done when well-seasoned to such climates, I will address them in the words of Cicero to his friend at Baiæ, which delicious winter retreat of the ancient Romans was remarkable then, but is much more so at present, for its unwholesome air during three months in the summer. "Gratulor Baiis nostriis: siquidem ut "scribis salubres, repente factæ sunt: "nisi forte te amant, et tibi assentiuntur, "et tamdiu, dum tu ades, sint oblitæ sui. "Quod quidem si ita est, minime miror, "cœlum etiam et terras vim suam, si tibi "ita conveniat, dimittere."

It is not the intention of this Treatise to disturb such favourable opinions as these, which it is proper should be entertained by all those whose station in life requires obedience without speculation. But a total ignorance of these important matters, or inattention to them, is, in commanders in chief, highly blameable, as well as extremely dangerous, since the lives of thousands may be lost by it.

SECT. II

The Diseases incident to Strangers, similar in different Climates; occur at particular Seasons; are confined to particular Situations. The Constitution of Europeans seasoned by Time to hot Climates. A Removal during the sickly Season recommended.

THE observations, which we have made concerning the respective salubrity of the different climates, in the four grand divisions of the world, point out those diseases which are most fatal to Europeans, in different countries: the situations have been shewn, in which they most generally occur, and the employments in which Europeans are most exposed to them. It now remains to deduce some useful conclusions from thence, for the benefit of such Europeans as settle in hot climates.

The first is, That the diseases of strangers, in different climates, bear every where a great similitude to each other; that the violence or malignity of the fevers and fluxes, to which they are subject, depend,

in a great measure, upon the degrees of heat and moisture; and that they are particularly influenced by the nature of the soil and of the winds.

Secondly, There is scarcely any country, however unhealthy, that has not its healthy and pleasant seasons. These last continue for the greatest part of the year, and at such times, it may with safety be visited by strangers.

Thirdly, The most unhealthy spots in the world have in their neighbourhood, and often at no great distance from them, places which afford a secure retreat from sickness. This has already appeared in part, and will be more fully proved in the sequel.—In a word, the diseases most fatal to strangers in every country, seem not only to be confined to particular seasons, but, even during those seasons, to certain places only.

Fourthly, By length of time, the constitution of Europeans becomes seasoned to the East and West Indian climates, if it is not injured by the repeated attacks of sickness, upon their first arrival. Europe-

ans, when thus habituated, are generally subject to as few diseases abroad, as those who reside at home; insomuch that many persons, dreading what they may be again exposed to suffer from a change of climate, choose rather to spend the remainder of their lives abroad, than to return to their native country.

These positions are very interesting to all who go abroad; and they lead us to the important object of this Treatise, the preserving annually a multitude of lives, as they point clearly out to us the easiest and the most effectual method for accomplishing that great purpose.

Strangers should always leave unhealthy spots, for a few months during the sickly season, until they become well inured to the climate.

This removal to a small distance from the seat of sickness, promises a security at least equally certain with the method now taken by Europeans, of shutting themselves up in their houses, and having no communication with the natives, during the rage of the plague in Turkey. It is like-

wise a precaution, upon which the safety of strangers, in unhealthy climates, may sometimes alone depend.

One cannot, without astonishment, reflect on the blindness of mankind, in never discovering this so simple and easy a method, which their own observation must have every day pointed out to them: yet our factories abroad have never paid any attention to it, and a proper method of doing it has never been recommended to them.

SECT. IV.

A convenient and safe Retreat from Sickness, pointed out.

It may, at first sight, appear almost impracticable to find a convenient and safe retreat from the sickness, which rages at times in many foreign climates. Mankind are more ready to start difficulties on this subject, than desirous to remedy them. Some will be ready to ask, for instance,

Where can that safe retreat be found, on the coast of Guinea, in the rainy season, when the whole country is almost covered with water?

The proper answer to this question is, That all places on that coast are not equally unhealthy. The English found the island of Goree much more healthy than their settlements either on the rivers Senegal or Gambia, and there fewer people died in proportion, than in the adjacent parts of Africa. We shall see from the following circumstance, that retreats of safety may be found even upon that coast.

The Portuguese, finding that almost all the European missionaries, whom they sent to propagate the Christian faith in Guinea, died soon after their arrival, found it necessary to establish a seminary of learning at St. Jago, for the instruction of black priests. But as their laws do not permit those of the black colour, to rise to the dignity of a bishop, the see of St. Jago was always filled by a person of this order sent from Lisbon. The lives of the bishops at St. Jago were generally so short, that

whoever was appointed bishop to the Cape de Verd Islands, considered himself as offered a sacrifice to the climate; till some years since, a sensible prelate, dreading the fate of his predecessors, procured a dispensation of absence from his cathedral, and was permitted to live in the island of St. Antonio. In consequence of this dispensation, the European bishops now live in this island, at a small distance from their cathedral, to as great an age, and in as good health, as if they had continued at Lisbon.

It is beyond a doubt, that on many other places of that coast, there are dry, elevated, and well ventilated spots, which, by being thoroughly cleared of wood, might be rendered healthy to European constitutions. We shall only mention the high hills of Sierra Leona, upon whose summits the air is clear and serene, while thick mists and noisome vapours overspread the lower grounds: yet even at this place the English inhabit a low valley, merely for the benefit of a spring of good water; the carriage of which, to any

part of that hill, might be easily performed by slaves.

It is astonishing to observe, that, while one third of the Europeans die annually in many of the factories, from their unhealthy situation, their negroes are permitted to lie idle or asleep the greatest part of the day, who might be usefully employed in clearing the ground around them, draining the swamps, and by burning or cutting down the woods, in opening avenues through them, for purifying the air.

The mortality of those Europeans must not therefore be attributed so much to the malignity of the climate, as to their own inattention. A foreigner who fixes his abode upon a sickly spot in England, as for example, at Hilsea* Barracks, in the island of Portsea, must not reckon the climate of Great Britain unhealthy, because he suffers from being placed on so bad a situation.

* Barracks well known to most of the officers in the army, for the prevalence of obstinate autumnal diseases, which frequently are confined to them alone.

In sultry climates, the smallest errors of this kind are attended with much more fatal consequences than in our northern latitudes.—The English castle at Whydaw has been rendered more unhealthy than the negro-town in its neighbourhood, by a small circumstance unattended to at first. It is built on a spot of ground that the sea-breezes cannot reach, without passing over a little inconsiderable brook, which produces some aquatic plants, always covered with an offensive slime.

During the present uncultivated state of Guinea, it is not probable that the Europeans will form any considerable inland settlements: their chief factories are situated near the sea; those therefore who reside in them can, scarcely have any where a better and more excellent retreat, in the sickly season, than on that healthy element*. It will occur to the reflection of

* In my other works I have given several instances, which clearly prove, that the sea air affords a certain asylum from sickness in all hot and unhealthy countries.—See my Essay on preserving Seamen, Chap. I. Sect. VI. and my Dissertations on Fevers, Chap. I. Sect. IV.

all who have visited such places, that the sea-breezes bring always health and a pleasant sensation along with them.

It was observed, that during the summer and autumn 1765, when fevers raged at Portsmouth, and in such ships as lay in that harbour near the mud, the men who were in the ships at Spithead enjoyed perfect health. For three months, when this epidemical sickness prevailed most, there was not one seaman or marine sent to Haslar hospital, who had been seized with it in any ship at Spithead.

When the violent and fatal sickness raged at Cadiz, it did not extend its influence to any ship which lay at a distance from the city; as I am informed by Dr. Maguire, an eminent physician of that place. His Majesty's ship the Tweed was then at anchor in Cadiz Bay: an officer and several of her men, who had been on shore, were seized with this fever; but all those who were sent on board the ships recovered, no bad symptoms appearing in their fever: whilst a disease, similar to the black vomit and the yellow fever, and equally mortal, depopulated that large city.

When Admiral Broderick's squadron lay at anchor off the island of Sardinia, as I before observed, it continued in perfect safety from those fatal diseases which seized almost all his men who slept on shore.

Lately, when a mortal sickness, in the year 1765, prevailed at Pensacola, by which a regiment newly arrived there lost 120 men, and eleven out of twelve of the officers' ladies, who were landed with them, were said to have died; the companies of the men of war, lying at a mile's distance from the shore, enjoyed the most perfect health. These ships were the Tartar and Prince Edward, of whose men, those only who had been on shore, were seized with this malignant fever, and all of them recovered when they got on board. It was likewise remarkable, that such gentlemen as were seized with this fever at Pensacola, and carried on board ships, quickly recovered; or at least, by this change of air, the fever, being divested of its most mortal symptoms, soon assumed the form of an intermittent.

From what has been said, we are not to

infer, that such as live in ships are always exempted from the diseases of the adjacent country: the reverse of this is often felt by our seamen, who sometimes, from accidents unavoidable, and often from an ignorance almost unpardonable, suffer more dangerous sickness than even many who live on shore. Thus, lying either near swampy grounds, or in close unventilated harbours, is equally dangerous with being on the land itself.

I am informed by Mr. Martin, surgeon of the Cataneuch, a Guinea trader, that when he was in Gambia river, in company with four other ships, the men, in one of those ships, were daily taken ill of fevers and fluxes, and several of them died delirious; while all the English in the other ships, and in the factories, were in perfect health: but upon removing that ship about half a league from her first anchorage, which was too near some swamps, her men became as healthy as those in the other ships.

SECT. V.

Ships recommended to be used as Floating Factories.

THE just inference, from what has been said, is, that if a ship was fitted up as a floating factory, and secured at a due distance from the shore, at the mouths of the rivers Senegal and Gambia, at Cape Coast, and all other places where it may be found necessary and safe, it would be a means of preserving every year a multitude of lives, especially on the Guinea coast.

The idea of a floating factory is not new to those who have been in Guinea: ships so called, have been securely moored on different parts of that coast, for the advantage of trade. But they are here proposed for the benefit of health, without which there is very little comfort, even in the advantages of commerce.

Such as have only seen merchants ships or coasting vessels, and are unacquainted

with the many conveniences which may be made in a ship, for the accommodation and entertainment of people of the highest rank, and of the most exquisite taste in luxury, will think it ridiculous to advise governors, and principal merchants, to sleep, or live, for three or four months in the year, on board a ship.

But we must not confound our idea of people, pent up in a small ship, or in a vessel at sea, undergoing all manner of hardships, suffering extreme hunger, incessant fatigue, and frequent disappointments, with the situation of persons living at ease, in a commodious ship, and furnished with all sorts of necessaries, by means of a daily intercourse with the country.

The admirals of our fleet, and captains of our ships of war, find in few places abroad, better entertainment, or more convenience, than in their own ships. In like manner, a floating factory may be fitted up, in any taste whatever, either for convenience or pleasure.

Mr. Doidge, late Secretary to Admiral Watson in the East Indies, upon his re-

turn home, being in an ill state of health, and having always found himself better when on the water, contrived a vessel of a commodious form, to which he gave the name of the Ark, in which he had resolved to spend much of his time. This little floating house contained a wine and coal cellar, a kitchen, a dining-room, and a sleeping room, elegantly furnished, and an apartment for his servants. In this floating mansion he proposed to reside during the heat of the summer, as a pleasant and cool retreat, for the benefit of his own health, as well as for the entertainment of his friends.

If, in addition to the many conveniences which a ship, properly fitted up, would afford to the gentlemen in any factory, we consider health and preservation of life as principal objects of their attention, the propriety of establishing such floating factories, where it may be found necessary and safe, can scarcely be questioned. There is good anchorage off the bars, both at Senegal and Gambia, in the road of Sierra Leona, and in many other places of

the coast, where ships with masts ride safely, at all seasons of the year: in how much greater safety must a ship at anchor then be, which has no masts? Shipwrecks are uncommon on this coast, as the most violent storms, the tornadoes, come always from the land, and are of short duration.

Those ships are proposed as a retreat from sickness during the rainy season, and for a few weeks after it, until health be restored to the country. They will also afford a pleasant retreat into a pure air, which will establish health of body, and cheerfulness of mind, at a time when thick fogs and heavy rains render the houses on shore damp and uncomfortable.

The sickness which might attack, at this season, any of the gentlemen on board the vessel, would be slight: it would probably be no more than a gentle diarrhœa, or a bilious complaint, which could be easily removed. In addition to those directions which I gave on a former occasion, for preserving a constant purity of air in ships*,

* See Essay on preserving Seamen.

they should keep a fire, especially during the night, between them and the land effluvia, which would be extremely conducive to health.' This might be easily done in a country where labour and fuel* are of small value: besides, the fire might be employed in distilling fresh water from the sea; so that, by this means, they might have the air purified, and at the same time be supplied with the most wholesome drink.

The vulgar and erroneous opinion, of the sea air being the cause of scorbutic and of other violent disorders, to which seamen in long voyages are subject, I have already confuted, in my Treatise on the Scurvy, and in my Dissertation on Fevers and Infection.

Notwithstanding the use of a floating factory, it may be also necessary to attend

* In order to avoid insects, let the wood or fuel brought from the shore remain in a boat until it is used; it commonly abounds with noxious vermin, and therefore ought never to be placed in any close confined part of the ship; it may be put with other lumber, in a small tender, moored near the floating factory.

to some directions which I have given in the Essay on preserving Seamen, for preventing sickness in those climates; persons should refrain from intemperance, and excesses of every kind. We do not recommend them to use any medical regimen, but to observe an habitual regularity.

As a proof of what may be done by a proper attention to those directions, in the most sickly seasons and climates, I shall subjoin the following particulars, communicated to me by Mr. Boon, who resided for three years at Senegal, as surgeon-general to the troops.

Mr. Boon being furnished with a copy of my Essay on preserving Seamen, he and several of the officers followed the directions therein contained. Governor Worge, Mr. Boon, and others, drank every morning for breakfast, by way of tea, an infusion of the bark, or of some other bitter ingredient, such as chamomile, gentian, orange-peel, or the like, in warm water. Sometimes they mixed with their tea a small quantity of the tincture of the bark. They drank these bitters morning

and evening, and took a gentle dose of manna, with purging salts, once or twice a week. They were abstemious in the article of food, and were particularly careful not to drink wine or spirits to excess: by which means, their stomachs and bowels were preserved in such a state, as greatly resisted the attack of those bilious fevers, fluxes, and other disorders, which raged there with destructive violence during the sickly season. Experience had so fully convinced them of the efficacy of those means, that the use of them became general; and when their stock of bark was exhausted, the most common bitter herbs or roots sold at an extravagant price. Much about this time, a ship from New York arrived at Senegal, which had on board some bark, and a quantity of gentian-root, orange-peel, and common wormwood, together with some bottles of Stoughton's Drops. These bitters became a valuable cargo for the proprietor, and were bought up at a high price by the governor and others who could afford to purchase them.

SECT. VI.

An immediate change of Air recommended on the attack of Fevers.

We proceed to offer one direction farther, for the benefit of those who have either neglected the directions already given, or who, from various circumstances, could not put them in practice: there may be many, whose indispensable business requires their constant residence in unhealthy places ashore, and who must therefore be exposed to the violent attacks of sickness.

The preservation of all such persons as remain in unhealthy places during the sickly season, will in a great measure depend upon an immediate change of air, as soon as they are seized with the prevailing sickness of the country.

I acknowledge it to be new, to propose the immediate removal of a person labouring under a violent fever, to some distant place, let the symptoms be what they will.

It may be objected, that the gentlest motion will, in many such cases, affect the head, and bring on a delirium, or increase the symptoms of the disease; that as uninterrupted rest and quiet appear necessary to the welfare of such patients, the hurry of motion, and even the disturbance produced by taking them out of bed, but especially the exposing of them to the open air, must be highly injurious.

The experience of many years in these matters has convinced me, that such apprehensions of danger are entirely groundless. I have had the most ample means of ascertaining, that persons labouring under fevers, fluxes, and other diseases, may with great safety be moved from one place to another; nay more, that by a removal of them, with proper care, from a bad into a pure air, such patients receive immediate benefit. Of many thousand patients labouring under fevers, whom I have visited in Haslar hospital for twenty-five years, nine-tenths of them were moved during the continuance of their fever, either from Spithead, from the ships in the harbour,

or from the marine infirmary at Portsmouth: they were brought in boats, or otherwise, to the hospital; and I do not remember that any patient was ever injured by such removal; on the contrary, I am persuaded that many hundreds, under the most dangerous and malignant symptoms of the disease, have received great benefit by the removal from the foul air of their ships into the pure air of the hospital.

The first step to be taken for the preservation of such Europeans as are taken ill on shore, during the rage of an epidemic sickness, is to remove them immediately, as far as possible from the original, and perhaps the only source of their sickness; that is, from the land into the sea air. The situation of such a person, while exposed to the influence of the same bad air which produced his sickness, is similar to that of a person in a contagious fever, who is constantly exposed to a fresh source of infection. The following relation therefore is not inapplicable to our present subject. I was once desired to visit an alms-

house, in which a low malignant fever prevailed, that had proved fatal to several of the poor people. This fever was evidently contagious, and the apothecary informed me, that he had treated it in the most approved way, and with such remedies as are prescribed by writers of character, without being able to stop the progress of the disease, or its mortality. Upon entering into this house, I perceived two or three dead bodies lying in the same chamber with the sick. Upon the beds of such as had died, new patients were laid, and the chambers abounded so much with stench and filth, that without asking the sick any questions, or inquiring farther into their cases, I gave it as my opinion, that as long as the dirt and nastiness of the place continued, they would prove such a constant source of infection, that the prescription of the most efficacious medicines would have little or no effect. This I found the apothecary had repeatedly, but unsuccessfully, represented to the overseers. His representations however were

now complied with, and the fever quickly disappeared.

In like manner, when a person is seized with a fever, proceeding from the bad air of a country, his illness, while he continues there, is daily, nay hourly, strengthened and reinforced, by a constant application, or as it were, inoculation of the morbid cause. We are taught by fatal experience, that the most sovereign remedies, and the best methods of cure that can be proposed, for the relief of such persons while they breathe an unhealthy air, are generally ineffectual. Diseases in such a situation generally become more anomalous, and are both attended and followed by symptoms which seldom appear in a purer air. From this cause, some of the best remedies have been blamed, notwithstanding they produced all the effects which could possibly be expected from them, whilst the patient continued exposed to these sources of disease. This calumny has chiefly fallen upon the bark.

In the late siege of the Havannah, while

the English troops suffered so much by the diseases incident to Europeans in those climates, the administration of the bark was blamed, because, after the fever had been removed by its efficacy, the patients were apt to be afflicted with the jaundice, the dropsy, or a swelling and obstruction in the liver.--But such diseases were much less dangerous and fatal than the fever, and were not the effects of the bark, but of the patient's continuing in an impure air, and of the duration of the fever*.

SECT. VII.

Effects of a bad Air on Persons in Health; its Effects on such as are sick; Consequences of removing the Sick in Fevers, from a bad into a good Air. How long the Effects of bad Air lie concealed in the Body; how far the Fever thence produced is contagious.

In order further to evince the propriety of an immediate removal of the sick in fevers, upon the first attack of the disease,

* See a full proof of this in the Appendix.

we shall point out first, the effects of bad air on persons in health; then its effects on such as are sick; and lastly, the consequences of removing persons immediately, when taken ill in such an air, into a place where that element is more pure and wholesome.

First, we are to consider the effects of the unwholesome air in hot countries, during the rainy seasons, on the human body when in health. Here it is remarkable, that the breast and lungs, as also the throat, through which the air in respiration passes, are generally the parts of the body which suffer the least, though in constant and immediate contact with it. The parts chiefly affected by it are the brain and stomach; or, in other words, the nervous system and the organs of alimentary digestion.

A phrensy or delirium, is often the first and immediate effect of a bad air. Young people in particular, are apt to have their head much disordered, and to be stupid or slightly delirious at times. Persons unaccustomed to such an air, though seem-

ingly in health, feel an oppression and lowness of spirits; they become inactive, have a great inclination to rest or sleep, and often complain of a head-ach; their reasoning faculties are, sensibly impaired, and particularly their memory. Every kind of study, or long attention of the mind to any subject, as likewise venery, are hurtful, and frequently attended with fatal consequences. The passions of the mind have here a much quicker and more violent effect on the body than in a purer and cooler air. An excess of passion often brings on an instantaneous attack of a fever; a violent fit of anger or grief will immediately produce a jaundice, or the yellow fever: the sight of a corpse, or any object of horror, and even a shocking story told to a person, have been often known, through an impression of fear upon the mind, to bring on a delirium, in one who was before in perfect health, and have sometimes occasioned a violent vomiting and purging, which have carried off the patient in twenty-four hours.

A bad air has also a great influence on

the stomach and intestines; it generally occasions a loathing and indigestion, and an aversion to much food: together with frequent bilious stools, which ferment like yeast. Those who seem to be otherwise in good health, become of a yellow complexion. Excesses, either in eating or drinking, prove much more pernicious to the constitution than in a purer air. A surfeit of fruit, or of gross food, but especially undue mixtures in the stomach, such as of flesh, fish, and fruits, taken at one meal, will often produce a violent dysentery, or a fatal cholera morbus. Drunkenness, or any debauch, will often give a fever, which in less than forty-eight hours terminates in the death of the patient.

It is also always a proof of a bad air, when wounds which are nearly healed, break out suddenly afresh, attended with great putrefaction of the parts. This happens both from the unwholesome air of marshes or impure ditches, and from the hot suffocating winds which blow from the desarts.

These are the effects on vigorous and healthy constitutions, of that noxious air

which is often breathed by Europeans in many unhealthy parts of the world. It will be proper next to observe its influence on the sick. For this purpose, we shall relate the effects of the unwholesome air from marshes in the climate of Jamaica.

At Jamaica a commodious hospital was erected for the reception of the sick seamen in his Majesty's ships on that station, which for its usefulness and grandeur, was called Greenwich Hospital. It was unfortunately built near a marsh, upon a most unhealthy spot of ground. The effects of this unhealthy situation were, that when a patient was sent thither with only a mild intermitting fever, this mild indisposition was often changed into a malignant fever, a bloody flux, or some other mortal distemper. The yellow fever often reigned there, attended with the most profuse evacuations of blood, by vomiting, stools, and even by every pore of the skin, when no such symptoms occurred in patients whose cases had been similar, and who were permitted to remain in their ships. The recovery of patients in that

hospital was observed to be very tedious and uncertain: the least irregularity brought on a relapse. After a flux had been stopped for some days, the eating of any sort of food which had a putrid tendency, such as even a mess of broth, would, sometimes in a few hours, bring on a return of the disease, accompanied with all its violent symptoms. Neither did this proceed from any infection in the hospital, or from its being too much crowded with patients: these things happened even when there were only a small number of patients in it, and those lodged in the best aired and in the cleanest wards. The mortality in this hospital was so great, and the cause of it so obvious, that there was a necessity for relinquishing it; no more sick were permitted to be sent thither, and another hospital, in a better air, is now fitted up for their reception.

Lastly, we may observe the excellent effects produced by removing the sick from an unhealthy into a pure air, when labouring under even the most fatal diseases.

We have already seen, that the men in the Middleburgh ship of war, speedily recovered upon being carried to sea. Their fluxes and fevers then lost the dangerous symptoms, and an immediate stop was put to the mortality which raged among them at Curaçoa. During the sickness at Cadiz and Pensacola, the removal of the sick into ships which lay at anchor in a pure air, produced the same happy effects.

A malignant sickness in the islands of Grenada and the Grenadines, proved very fatal to the English, who, upon the conclusion of the peace in 1763, first went over to settle there; and it was observed, that such of the sick as were put on board the ships to be sent to Barbadoes, generally recovered at sea, before they reached their intended port.

Numerous observations might be given, to confirm what has been advanced on this subject; but to multiply them is unnecessary; as the effects of a change of air even upon agues and fevers in England are well known, and as the imme-

diate success which attends the use of the bark, and other remedies, in a purer atmosphere, is ascertained by daily practice.

It remains only to be added, that in the most malignant diseases, the immediate removal of the patient into a purer air, is often the only method to preserve his life.

Thus when the Medway and Panther suffered great distress at Batavia by a violent and mortal fever, of which we have already taken notice; all those who had been seized on board the Medway, as soon as she put to sea, recovered immedi-diately, to the number of thirty-five or forty; whereas the Panther, by continuing at Batavia a fortnight longer, lost above fifty men; and although there were some few who died on board the Medway, after she left Batavia, they were only such as had been long ill, and who seemed to perish for want of proper necessaries and restoratives at sea. Upon leaving that unhealthy port the fever entirely disappeared.

It is not to be understood, that so fortunate a circumstance will always attend ships, upon their leaving an unhealthy place: the effects of the injury already received on shore, from the land air, may not appear till some time after the ship has been at sea; or a contagion may be generated, even at sea, from causes which it is difficult to ascertain.

Two questions naturally arise from the subject, equally curious and important.

First, How long a taint from the land air may lie concealed within the body, before it produces a fever?

Secondly, How far this fever is contagious?

With regard to the first question, from comparing many instances, of people who have slept on shore during the sickly season, and in consequence of it, who alone have been taken ill out of the whole ship's company, than lying in an open road, it appears, that some are immediately seized with sickness or delirium; many are not seized with them till they have been on board for two or three days; several have

been only slightly indisposed, for the first five or six days; and in a few, the symptoms of indisposition have not appeared before the tenth or twelfth day.

How far this fever, as produced by the land air, is contagious, it is more difficult to determine; the exemption from it, which those generally enjoy who sleep at a distance from the shore, while others, who have suffered by a neglect of that precaution are sick on board, seems to prove it void of any contagion. But, upon a more narrow examination, we shall be inclined to adopt a contrary opinion. Passing in silence the many means whereby infection may be communicated, so as to elude the strictest inquiry, not only immediately from the diseased person, but from his clothes or attendants, we need insist only on positive facts.

In the Weasel and Hound, two sloops of war, which happened to be in the river Gambia, in the beginning of August 1769, at which time the rainy season commenced that year, it was observed, the sickness did not begin till two or three days after they

had received an infected person on board, notwithstanding they had been eight or ten days in that river. Their being at the same time exposed to the land air, almost equally with those who were in the fort, by anchoring up the river, might greatly increase the malignity of the disease; but does not weaken the opinion of its being received by contagion, which is fully proved by a curious particular given by Mr. Robertson, in an account of his own case.

This gentleman, when feeling the pulse of a boy dying in the fever, immediately as he expired, received a shock as though electrified, attended with a disagreeable sensation, not easily to be expressed, and quickly followed by a prostration both of strength and spirits, so that he had almost fainted before he reached his apartment; and afterwards suffered a very severe attack of the fever.

Both these positions will receive farther confirmation by what occurred on board the Merlin sloop, which was at Gambia in the same month the preceding year.

She continued six days in the river, employed in wooding and watering. While there, all the men were in perfect health, but in about two days after they put to sea, those who had been employed in wooding were successively taken ill; afterwards those who had been employed in the duty of watering, were seized in the same manner. At first these men alone were seized with the fever, and several of them in a day continued to fall sick for six or seven days; at length almost all that had been employed in those services were ill; after them, their attendants were seized with the fever, and in such numbers as to leave no doubt of the disease being infectious.

Many other instances may be produced of a similar nature, which, from their number, it will be unnecessary here to mention.

We may thence justly conclude, that the fever may be communicated by contagion; but that this contagion is very slight, unless co-operating with a bad air; and in a ship is often greatly checked, if not

wholly destroyed, by going out into the open sea. For notwithstanding the virulence of the distemper was greatly enforced in those sloops, when up the river Gambia, by being constantly exposed to the noxious land air; yet it was so much checked, upon those ships putting to sea, that they scarcely buried one-tenth of the men which the fort generally does every rainy season, out of a proportional number. For of ninety men, which each of these sloops had on board, the Weasel lost in that fever ten, the Hound six, and in the preceding year the Merlin four, being 20 in all, out of the number of 270, who were on board those sloops.

A virulent contagion may indeed occur in ships at sea; but that generally proceeds from other causes, into which our subject does not at present permit us to inquire.

SECT. VIII.

The Sea Air beneficial in Fevers; its Effects in an Epidemical Fever at Naples. An Infirmary-Ship recommended: Its peculiar Advantages. Of seasoning the Constitution to hot Climates. Sudden changes from Cold to Heat, and Heat to Cold, productive of the same Diseases.

WHETHER there be any quality in the sea air, besides its purity, that renders it so particularly healthy to patients labouring under those remitting fevers and other diseases, which are the subject of this Treatise, I will not take upon me to determine; my intention is to advance facts, and not conjectures. This much is certain, that in some other fevers also, a change of air has been found very beneficial: the recovery of the patients has been greatly promoted, by removing them from inland places into the sea air.

In the year 1764, the kingdom of Naples furnished a very remarkable example of the healthiness of the sea air, and of the benefit of removing the sick thither, during

the rage of an epidemic fever. For the account of this fever, as well as for many useful observations given in this work, I am obliged to my friend Sir John Eliot, an eminent physician in London.

"From bad policy in permitting too great an exportation of corn, there was not a sufficient store left in the public granaries of Naples, and the country became destitute of provisions. In the months of April and May, the scarcity was so great, that the poor people tore up the grass and green corn for subsistence, and fed on every thing in which they supposed there was any nourishment.

"A malignant fever came on, and raged with more violence, as the famine increased. Hunger drove multitudes of people from the country to the capital, in hopes of being better able to procure subsistence there. The city became more and more crowded, and every day numbers dropped down dead in the streets. The force of hunger became so strong as to break through the firmest ties of nature: mothers threw away their children, fathers

forsook both; each person being fully employed in search of food for himself. So great and so general was this scarcity, that villages became depopulated by death and migration.

"The kingdom contained about two millions of people, one-fifth of whom it is supposed to have lost by this calamity: two hundred thousand by death, the rest by deserting their habitations, to seek subsistence in the neighbouring countries.

"The situation of Naples is remarkably healthy; it is very populous, the streets are numerous, the houses five or six stories high, and very much crowded. The inhabitants are extremely remiss in the article of cleanliness, both within and without their habitations.

"When we consider all these circumstances, the heat of the climate, and the want of proper food, it will not appear surprising, that this malignant fever raged with uncommon violence, and was every where propagated, from the number of sick dispersed up and down, in all quarters of the city, the little care taken of

them, and the negligence in burying the dead. The absurd custom of exposing bodies to view, when carrying to the grave, might even add to the progress of the distemper.

"'This malignant fever was accompanied with worms in the stomach and intestines during the month of May; in June worms were less frequent. In July, it became highly infectious, was attended with petechiæ, swelling of the parotid glands, obstinate delirium, violent vomiting, and fluxes of blood."

This disease raged, with unremitting violence, for a considerable time, till it was happily observed, that the sick who were moved into the hospitals near the sea, recovered much quicker than in other places, and few of them died. Upon this being represented to the King, money was ordered out of the treasury, for the fitting up of other hospitals near the sea. In these hospitals, well ventilated, and open to the sea air, the progress of the contagion was entirely stopped; none of the nurses or attendants on the sick were infected; and

even when they became crowded with sick, the number that died in them was inconsiderable, in proportion to the number who died in other places*.

To return to our more immediate subject; it would be proper, during the sickly season, on the coast of Guinea, and all other places in the East and West Indies, where the English factories are near the sea, to have another ship, besides that appropriated for the residence of the gentlemen of the factory, fixed at a proper distance from the land, to receive the sick immediately upon being taken ill. It would be a certain means of saving many lives. This ship might be considered as an hospital for the factory.

The name of hospital, or hospital ship, may convey a frightful idea of sickness and mortality to some people, but without rea-

* Vegetable acids in large quantities, ice water, and the bark, were the great remedies. Musk was found useful in relieving the head-ach.

Mineral acids, where livid blotches and other malignant symptoms appeared, were administered with good effects.

son; on board such ship, if kept perfectly clean, and never crowded, the sick may be well accommodated, and will always breathe the purest air. Upon the least suspicion, infection may speedily and effectually be removed, by the methods given in my Dissertations on Fevers and Infection.

In Europe, all nations have hospitals; and many of them have found it absolutely necessary to erect hospitals or infirmaries for the sick, in their settlements and factories abroad. The difficulty is, to find a convenient and healthy spot: the manner of obviating this we point out, by proposing to have the hospital upon the water. Thus a ship or hulk moored at the mouth of the river Senegal, and properly fitted for the reception of the sick in that garrison and factory, would in a great measure put an end to the dreadful mortality amongst our troops and settlers in that part of the world: transferring the sick and their hospital, from the land to the water, is more particularly recommended to that settlement, as it becomes an ob-

P 2

ject not only to the merchants but to government, on account of the soldiers stationed there, to whom it would be attended with many advantages.

In the first place, on board a ship, with proper care, a greater degree of neatness and cleanliness may be procured for the sick, by means of funnels pointing to the sea, and wash cocks to cleanse them occasionally, than in most infirmaries on land.

2dly, When it is difficult to procure good water on shore, they may at sea be supplied with the most wholesome fresh water, from the element which surrounds them, by a simple distillation; a discovery which the author of these sheets was so fortunate as to make in the year 1761*: if more be wanted for common uses, sails or awnings, properly extended, will procure them a sufficient quantity of rain water.

Here it may not be improper to take notice of a common opinion, which prevails in those parts, that such as have been thoroughly wet with rain, or other fresh

---

* See the Appendix, and Essay on preserving Seamen.

water, will from thence suffer no indisposition, provided, before putting on dry clothes, they dip themselves in sea water, or wet their skin all over with a sponge dipped in it.

3dly, A more free circulation of air can be obtained in a ship than on shore. I have, in a former publication*, pointed out the methods of rendering the air in a ship at all times wholesome, by means of purifying fumes and fires: I may now add, that when ventilation, or a change of air, becomes necessary, it may be more effectually accomplished in a ship, by opening some port-holes, than in most chambers on land. A ventilator may likewise be provided, for more effectually keeping dry the timber and the lower apartments in the ship: this may be worked by a wind-mill fly; or the ventilator itself may consist in a wind sail. It is necessary to observe, that all these ventilators should be made use of only during dry weather. For the preservation of the ship, the bottom should

* Essay on preserving Seamen.

be sheathed with copper. From the rains the ship may be defended by a timber shade or spar deck, projecting a little over her sides; which will also afford an effectual protection from the violent heat of the sun during the intervals of the showers, and occasion an agreeable ventilation, when there is any, the least wind.

4thly, Besides the benefits of dry, neat, and clean accommodations, good water, and a pure air, it is in the watery element that the most wholesome nourishment, and the most proper food for the re-establishment of health, is to be found; I mean, a great plenty and variety of fish. When the sick in those countries can be supplied with green turtle, they recover very quickly, not only from the scurvy, but from most diseases proceeding from a relaxed habit of body and a watery state of the blood. It has been often remarked, that fluxes, dropsies, and an infirm constitution, which are the frequent consequences of acute diseases in those climates, proceed in a great measure from the low poor diet of the country. This consists

chiefly of boiled rice, lean goats, fowls, and food of that kind; which render the recovery of Europeans extremely slow and tedious. In those climates, fish caught at sea are with difficulty procured for sick or weak people on shore, as they cannot be preserved fresh many hours, and are often tainted before they can be brought on shore. They are so apt to corrupt, even during the coolness of the night air, that it is a prevalent opinion among the fishermen there, the moonlight has a quick and powerful influence in spoiling them.

By a peculiar blessing of Providence, not only the river Senegal, but all the great rivers whose sources are within the tropics, have deposited, by their annual inundations, great quantities of slime and mud at their openings into the sea, which form what are called the bars to those rivers. Those bars or shoals, consisting of a fine soft ooze, often extend themselves many miles from the land, and afford not only a safe anchorage for both the floating factories and infirmary ships, but also abound with an incredible quantity of excellent fish,

One man in the infirmary ship, lying off Senegal, or in most other places on the coast of Guinea, will be able to catch as many fish, of different sorts, in two hours, as will be sufficient for the nourishment of a hundred sick people. It has been found by experience, that no food whatever contributes more to the perfect recovery of health and strength, and to the prevention of the fatal consequences of fevers in hot climates, than fish, or rich nourishing fish soup, warmed with the spices of the country, and if necessary, rendered palatable by the addition of lime-juice.

Upon the whole, the immediate removal of the patient from a bad air, as soon as he is perceived to be affected by it, into the infirmary ship, will, in all probability, render his disease mild and curable, and his recovery speedy and perfect.

The constitution of Europeans, preserved by these means, will become in a course of time so seasoned and habituated to the climate, that it will be afterwards much

less susceptible of any injurious impressions, either of the air or soil. One merchant, factor, or soldier, thus seasoned to the country, becomes more useful, and his services may be more depended upon, than ten newly arrived, unseasoned Europeans.

It has been a received opinion, that the first fever, or fit of sickness, alters the constitution, so as to season it to a new climate; but I do not find this supported by experience: sudden changes of climate are generally the cause of sickness; a seasoned constitution, in any part of the world, is chiefly to be acquired by remaining there for some length of time; and a fit of sickness, by weakening the constitution in general, disposes to future returns of it.

From the very numerous opportunities I have had, of knowing the general state of health enjoyed by the seamen on board his Majesty's ships in foreign voyages, it appears that sudden changes from heat to cold, or from cold to heat, produce almost similar effects.

When a number of seamen and soldiers sail from England to the West Indies, and are immediately landed, thus feeling the full effects of a sudden transition from a cold climate to a very great degree of heat, many of them will be seized with a diarrhœa.

In like manner, if the stationed ships from the West Indies, which are generally relieved at the expiration of three years, arrive upon the coast of England in the winter, and by contrary winds are kept long exposed to the cold, the men, having been accustomed to a hot climate, will again be attacked with diarrhœas; the cure or removal of which, will entirely depend on keeping the patients warm.

The men immediately landed in the West Indies will also be liable to the fevers of the country, and such of them as drink immoderately of new rum, to ardent fevers. But if such men, before being landed, are kept on board of ship much at sea, and the ship does not put into any very unhealthy port, especially during the sickly season, they will be in a great measure ex-

empted from those fevers; and after being twelve months in the West Indies, they will become seasoned to the climate, and will frequently enjoy as good a state of health as if they were in England.

CHAP. II.

ADVICE FOR THE PRESERVATION OF SUCH EUROPEANS IN HOT CLIMATES, AS RESIDE IN INLAND COUNTRIES.

SECT. I.

Europeans, during the sickly Season, to retire to healthy Situations. Unwholesome Spots of Ground to be found in the most healthy Countries; and healthy Spots in the most sickly Countries. Purity of the Air in many Places in the Torrid Zone.

WE come now to point out a method of preventing the mortality which attends Europeans, in those situations where the advantages of a floating factory cannot be enjoyed. It is to be hoped, for the sake of humanity, that those who have the power of directing, will pay some regard to it.

Many inhabit inland places at a distance from the sea; others cannot have the benefit of a secure retreat on that element,

from the want of a safe anchorage for ships at the necessary distance from the shore. It is sometimes difficult to procure a convenient retreat upon the water, as in places where unwholesome marshes are formed, by frequent inundations of rivers or the sea; or where the shores are lined with stinking ooze, mud, and aquatic plants of a noxious quality.

Under these circumstances, Europeans, during the sickly seasons, must retire into the country, to some healthy spot in their neighbourhood. Upon this occasion it is necessary to recapitulate our two former positions.[a]

1st, That the most healthy countries in the world, generally contain certain spots of ground where strangers are subject to the attacks of sickness.

2dly, That there is hardly to be found any large extent of continent, or even any island, that does not contain some places where Europeans may enjoy an uninterrupted state of health during all seasons of the year.

In proof of the first position, I may in-

instance as healthy a piece of ground, for its extent, as any in England, I mean the Isle of Wight. This Montpelier of England, for its air and productions, has a small town called Brading, where agues prevail much, which, on account of their obstinacy, are by the islanders called Kentish agues. This disorder, which is little known in many places of the island, often does not extend itself a mile from Brading, and is particularly inveterate in one farm-house in that neighbourhood.

The healthy island of St. Christopher's, in the West Indies, has its Basse-terre, and Barbadoes its Bridge-town, which prove sickly to strangers at particular seasons; while the other parts of those islands are remarkably healthy and pleasant.

As a proof of the second position, I shall offer Antigua. This island, especially near English Harbour, is remarkable for its unhealthfulness, as our ships of war frequently experience, in the loss of their men by the yellow fever and flux, when they refit in that harbour. But an absolute safety, and a secure retreat from these

diseases, are to be found in the high mountains of that island, especially in that called Monk's Hill, of which the following affords a convincing proof.

In the beginning of the French war, about the year 1756, when the French neutrals were removed from Nova Scotia, a ship bound to Virginia, in which they were embarked, was driven by stress of weather to the island of Antigua. This mixed company of men, women, and children, were all sent to Monk's Hill, in order to recover from the fatigues of their voyage. Soon after this a general sickness raged in the island. Our seamen in English Harbour, during it, suffered a great mortality by the yellow fever and flux; but the English soldiers who composed the garrison at Monk's Hill, and the neutral French, though but lately arrived from their cold native country, Nova Scotia, enjoyed a most perfect state of health, and were totally exempted from the prevailing distempers of the island.

When the English troops were at Guadaloupe, they found one part of that island

extremely pleasant and healthy; and another part of it so sickly, that when a regiment or company of soldiers was ordered thither, they were certain of losing a great part of their number.

The island of Dominica is in most places woody and unhealthy, especially about Prince Rupert's Bay; yet there are several French families in it, who, by fixing their residence on the sides of hills, live free from the attacks of agues and fevers, the diseases common there; and thus enjoy a good constitution, and as firm a state of health as if they were in France.

In the unhealthy island of St. Jago, there is a place called St. Domingo, where, on account of its wholesome air, it is usual for the governors, upon their arrival from Europe, to spend some time before they venture to fix their residence at the capital: by this means they gradually become seasoned to that sickly climate.

In the neighbourhood of Mobile, Pensacola, and other places in the most unhealthy parts of West Florida, there are several elevated situations, dry, and ex-

posed to the winds, which would afford a safe retreat from the diseases which prevail in the months of July, August, and September.

The country of Brazil is esteemed by the Portuguese a paradise, chiefly on account of the purity of its air in most places. When the sun is vertical, the air is refreshed and cooled by the sea breezes; and its inland parts are fanned with still cooler breezes from the high mountains. So that the Portuguese prefer the air of the Brazils, at the small distance of a few degrees from the equator, to that of their native country.

From 10 degrees north of the equinoctial to 55 south, there runs through the continent of America a continued chain of very high mountains, called the Andes, or Cordilleras. The tops of those mountains, even under the equator, are covered with snow, and by reason of the severity of the cold, are rendered uninhabitable to man or beast. In descending from thence, the traveller begins to breathe a healthy and temperate air, where the joyful season of

spring, with all the early productions of nature, present themselves. Descending still lower on the sides of those mountains, he finds himself surrounded with rich and luxuriant pastures, breathing forth the odours of a pleasant and serene summer.

Thus, under the scorching heat of a vertical sun, there are large extents of country, where Europeans may breathe a pure untainted air, of such a temperature as best suits their constitutions.

Heat does not altogether depend upon a proximity to the equator, but varies at inconsiderable distances, chiefly according to the elevation of the ground, the degree of ventilation, and the nature of the soil.

Upon the soil, the temperature of the climate, the colour, strength, and activity, the constitutions and health of the inhabitants greatly depend. This truth is well known to those who trade for slaves on the African coast. The negroes they purchase are dull and stupid, lively and ingenious, sickly or robust, long or short-lived, according to the nature of the soil in the country from whence they are brought.

SECT. II.

An elevated and temperate Situation on the Side of a Hill, recommended as a Retreat from Sickness in hot Climates. This Asylum for Health to be met with in almost all Parts of the World.

FROM the preceding positions I infer, that the safest retreats, not only from the sultry heats and the inundations of a low country, but also from the sickness attendant upon them, are to be found on the sides of hills or mountains, where there are no morasses within three miles; preferring such places where the vapour arising from the surrounding vallies cannot affect them, at least in its perpendicular ascent. Experience fully confirms this truth, that in such elevated and temperate situations, where the soil is dry, gravelly, and clear from wood, shrubs, or stagnating water, Europeans enjoy good health in the hottest climates, during all seasons of the year.

This asylum for health is to be met with

in almost every quarter of the globe. The weary traveller, even in some parts of the sultry desarts of Arabia, may, in the middle of summer, behold from afar the summits of the Persian and Turcomanian mountains covered with snow, and their sides lined with a refreshing verdure, which is constantly fanned with a pure and temperate air.

Most of our principal factories in he East Indies, have, in their neighbourhood, places of easy and safe retreat from sickness during the wet season. In Sumatra, Fort Marlborough affords a retreat tolerably safe and convenient, at the distance only of three or four miles from our sickly settlement of Bencoolen: in this fort, the English merchants ought constantly to sleep during the sickly season, and for some time after it: others who choose it, may go to Sillebar. The unhealthy town of Calcutta, in Bengal, has in its neighbourhood the healthy situations of Barasatte and Garatte; where the gentlemen residing at Calcutta should retire in the months of July, August, September, and October.

Both Charnagore and Chinsura, the French and Dutch settlements in Bengal, are more healthy than Calcutta.

The Dutch at Batavia, for the benefit of a quick and easy conveyance of such as are in a convalescent state, have made an excellent road for 70 miles, leading from that city to the mountains, equal to any turnpike road in England. It were to be wished, that not only convalescents, but such sick persons whose case will admit of so long a journey, were also sent thither, or at least to the more healthy situations of Cerebon, Samaring, or Tanjapour, in its neighbourhood.

The English at Bombay enjoy the benefit of having several rising grounds near them, from whence, during the rainy seasons, they may in safety behold the adjacent country covered with water. During the rains innumerable pools of stagnating water are formed, which quickly become full of frogs and fish *; on the pools drying up, these corrupt, and their stench

* It is a phenomenon incontestibly true, that in stagnating pools of water at Bombay, produced

proves very injurious to European constitutions.

Within nine miles of Madras stands the mount St. Thomas, justly esteemed, for its air, the Montpelier of the English settlements in India. Persons labouring under a violent intermitting fever at Bengal, are commonly no sooner brought to Madras, than their distemper leaves them. Such as have been reduced to so great weakness as to be under the necessity of being carried up to St. Thomas's Mount, have in three or four days acquired such a degree of health and strength, as to be able of themselves to ascend 127 steps made in that rock, for the more easy access to this paradise of health.

Not only continents, but most large islands in every quarter of the world, have ridges of high mountains, where the air

---

solely by the rains, which have no communication with any river or the sea, living fish are generated; many persons have eaten of them; upon the drying up of the pools they die, and frequently are very offensive.

proves healthy to European constitutions. Even in the smaller islands such a retreat can generally be found.

Among the islands possessed by the English in the West Indies, I have already mentioned Monk's Hill, as affording a safe retreat from sickness in Antigua. We have taken notice of the wholesomeness of the air in the mountains of Dominica. In the healthy and pleasant island of Barbadoes, there is a hill called Scotland, or the Highlands, where the air is purer and more wholesome than in any other place. It is to be hoped, that as Grenada and the Grenadines, which have proved so fatal to the English planters, are cleared of woods, due attention will be given to eligible situations for houses; the advantages of which we have so strongly pointed out: we shall then hear nothing more of fatal diseases sweeping off the inhabitants of these islands.

SECT. III.

An Application of the Directions to the Island of Jamaica.

We shall now collect the whole of our directions, by an application of them to the island of Jamaica.

Jamaica has one continued ridge of mountains running through it, from east to west, besides some smaller hills. On the sides of those mountains the air is temperate and cool, while the vallies are scorched up with excessive heat, or overflown by violent rains.

Part of this mountainous ridge is at no great distance from Spanish Town, the capital, nor from Kingston or Port-royal, the principal sea-port. Therefore, if chosen spots of ground on those mountains were set apart, some for the recess of families in health, and others for the reception of the sick, the most beneficial consequences would result to the white inhabitants of that island.

We do not recommend a retreat to the barren, cold, and bleak summits of the Blue Mountains; where the sudden transition from the scorching heats of the vallies to so intense a degree of cold, must be injurious to the constitution; nor a retreat to such an height, as where the vapours are condensed into mists or clouds. But we recommend a removal into a more temperate and pleasant situation; where the heat of the day seldom exceeds 70 degrees on Fahrenheit's thermometer, and the cold of the night is not under 54 degrees: where the ground is cleared from wood, and has no stagnating water upon or near its surface; where the soil is rich and fertile, favourable to the cultivation of European plants, and to the health of European animals; and where sheep brought from England still retain, without inconvenience, their fleecy covering.

There are large flat spots of ground in those mountains, which, by industry and cultivation, might be converted into the most healthy and delightful rural retirements. In many places there, where at

present the chillness of the evening renders a fire comfortable, and even requisite to an European constitution, the improvement of the soil would gradually mend the quality of the air.

Governors newly arrived at Jamaica, of whom many have died soon after their landing, or any gentleman who can afford to keep a horse or carriage, after doing business at Spanish Town or Kingston, might, before sun-set, return to such a healthy and pleasant country seat as is here recommended; taking the precaution of never sleeping else here during the sickly season.

But without respect to a governor, or any particular person, this proposition, in a more extensive point of view, demands the most serious attention. Though the island of Jamaica is at present much healthier than formerly, yet in certain months of the year it is infested with fevers and fluxes; which in some years prove very epidemical and fatal.

It will be found, that the most certain means of preserving such a number of

Europeans as frequent that island, nay, their chief security upon their first arrival, consists in this, that those whose circumstances and business will permit, should retire, especially during the night, to the mountains for health, until they are seasoned to the climate; and that others who cannot afford this precaution, be immediately removed thither when taken ill.

The sick at Kingston or Port-royal, may be carried in an easy and commodious vehicle six or seven miles to the hills in the parish of Leoganie; or they may have the benefit of water carriage to Port Passage, and from thence be conveyed to the hills near Spanish Town, when proper houses are built for their accommodation in that cool and wholesome air.

It is certain, that a person labouring under a fever or flux, will be much less endangered by being conveyed twenty miles on his bed, in a proper carriage, than by continuing twenty hours in the air which produced his distemper. The immediate removal of the patient, in such cases, into another air, often abates the most alarming

symptoms of the disease, and that even in a few hours.

When the Lion, Spence, and several other ships of war, were employed at Port Antonio, in the island of Jamaica, in clearing Navy Island of wood, in order to build wharfs and store-houses there, many of the men, when cutting down the wood, were seized at once with a fever and delirium. This attacked so suddenly, and with so much fury, that often the person seized would with his hatchet, if not prevented, have cut to pieces the others who stood near him. Orders were issued, that as soon as the men were thus seized, they should be bled, and immediately sent on board their respective ships. The consequence was, that all who were carried on board quickly recovered; whereas those who remained on shore, either died, or suffered a dangerous fit of sickness.

It was formerly not uncommon for six or eight of the centinels who were posted at Greenwich Hospital in Jamaica, which was situated in a marsh, and is now evacuated, to be taken ill in one night, with copious

vomitings or purgings, a delirium, and all the alarming symptoms of a violent fever, of which they recovered in some hours after they were removed to Kingston.

But should a change into a purer air fail to produce such immediate effects, it will at least mitigate the symptoms of the fever; the use of medicines will afterwards be attended with more success; and the patient will recover sooner, and will more speedily regain a vigorous state of health.

I shall here insert an observation, communicated to me by a very sensible man, who resided long in Jamaica.

" I have often observed the poor seamen in the merchant service to recover " from the yellow fever, solely by having " the benefit of a free and constant admission of the cool sea air, into a ship " anchored at a distance from the shore, " where they lay utterly destitute of every " assistance in sickness, and even of common necessaries, having nothing but " cold water to drink, and not so much as " a bed to lie upon: while gentlemen " newly arrived from England, by being

"shut up in small, close, suffocating "chambers at Kingston or Port-royal, "expired with their whole mass of blood "dissolved, flowing from every pore; the "stifling heat of their room having pro-"duced a state of universal putrefaction in "the body, even before death."

What I have said of Jamaica, is applicable to every unhealthy spot of ground, and to all our islands and plantations, both in the East and West Indies.

SECT. IV.

Particular Exceptions of no force against general Observation. Fatal Effects of remaining all Night in unhealthy Places. Sickness arising from that Circumstance, vulgarly ascribed to ridiculous Causes. A change of Air beneficial in all Epidemical Distempers.

In opposition to what has been said, it may be urged,—That in several places, mentioned as a secure refuge from sickness, there are instances of persons being seized with the diseases of the adjacent

country. The yellow fever has been known to seize persons in the garrison of Monk's Hill in Antigua!

But inferences drawn from a few uncommon cases, have no force against general observation and experience. Even in England I have met with instances of all the West India diseases, yet there is no person who on his return to it does not in a general view consider himself exempted from their attack. In a long course of practice, I have seen the tetanos, emprosthotonos, opisthotonos, and locked-jaw, in as violent a degree as occurs under the torrid zone; and have seen the dry belly-ach, the black vomit, the hepatitis, all diseases, in a manner, peculiar to sultry climates. I may therefore justly adhere to the principles already laid down.

Unless the garrison of Monk's Hill had been apprised of the danger of sleeping in unwholesome places, and had cautiously avoided sleeping out of the garrison, the question cannot be fully determined, whether persons who never slept out of Monk's Hill, were attacked with the diseases of

the adjacent country? It is my opinion they seldom or never would.

I mentioned the affair to a person who had resided long in English Harbour in Antigua, and he informed me, that he had known some of the garrison on Monk's Hill to have had the yellow fever. I desired he would endeavour to recollect the circumstances of their being taken ill, and whether they had slept any nights preceding their illness in the low grounds, or in English Harbour. It immediately occurred to him, that when he was seized with the yellow fever, there were at the same time two officers belonging to the garrison at Monk's Hill labouring under it, who had both been seized with it early in a morning, after sleeping the two preceding nights at English Harbour. Upon beginning to consider the great danger of sleeping in unhealthy places (with which he was before entirely unacquainted) he recollected, that most of the people in Monk's Hill who had been seized with this fever, were taken ill after sleeping on the low grounds; it being a common cus-

tom among the officers of that garrison to sleep in the house at English Harbour, where they dined and supped.

If persons will run the hazard of their health and life, by remaining all night in unhealthy places, they cannot expect to reap the benefit of safety and security from a healthy air in their neighbourhood.

Additional proofs may be brought, of the melancholy effects of inattention to the important advice of never sleeping in unhealthy places; which I hope will serve farther to prove the utility, and to enforce the observation, of the directions which we have recommended.

In the year 1766, sixteen French protestant families, consisting of sixty persons, were sent, at the expence of the English government, to West Florida. The ground allotted for their residence was on the side of a hill, surrounded with marshes, at the mouth of the river Scambia. These new planters arrived in winter, and continued perfectly healthy until the sickly months, which in that country are those of July and August. About

that time eight gentlemen (from one of whom I received this account) went to this new settlement to solicit votes for the election of a representative in the general assembly of the province; by remaining but one night, every one of them was seized with a violent intermitting fever, of which the candidate for becoming the representative, and another of their number, died. The next day seven other gentlemen came upon the same business to this unhealthy spot; but by leaving it before night, they escaped the sickness, and all continued in perfect health. Among the French settlers during these two months, the annual fever of the climate proved so fatal on this unwholesome spot, that of sixty persons, fourteen only survived; and even those who remained alive, in the September and October following, were all in a very ill state of health; not one of them had escaped the attack of the fever, and most of them died within a few months afterwards, from the injury it had done to their constitutions.

In a voyage to the coast of Guinea,

performed in the year 1766, by the Phœnix ship of war, of 40 guns, the officers and ship's company were perfectly healthy, till, on their return home, they touched at the island of St. Thomas. Here the captain unfortunately went on shore, to spend a few days in a house belonging to the Portuguese governor of that island. This happened during the rainy or sickly season. In the same house were lodged the captain's brother, the surgeon, some midshipmen, and the captain's servants. But, in a few days after their being on shore, the captain, his brother, the surgeon, and every one, to the number of seven, who had slept in that house, were taken ill; and all of them died, except one, who returned to England in a very ill state of health. The ship lay at anchor there twenty-seven days; during which time three midshipmen, five men and a boy, remained on shore for twelve nights, to guard the water casks, under pretence that the islanders would steal them; all of whom were likewise taken ill, and two of them only escaped with life. At that

island, only those who slept on shore were taken ill; no other man of the ship's company was seized with any distemper during their stay there. Even during the whole voyage, if we except these unfortunate persons, only one man died, and he was killed by an accidental blow upon the head.

None of those who slept on shore escaped the sickness, and of them only three survived it: a midshipman, who has ever since been in a cachectic state, for which he was a patient in Haslar hospital; a seaman, in the same condition, who has since been twice under my care; and a molattoe, one of the captain's cooks, who not being able to regain a good state of health in England, is now returned to Guinea, under a notion that he was poisoned there, and can only be cured by medicines administered by the negroes.

The sickness in this island began much about the time that the Phœnix arrived; and the governor had then taken his usual precaution at such seasons of the year, of retiring into the highest apartments of his

house; where he lived in a great measure shut up from the access of the external air, and from company.

Whilst the Phœnix continued in this place, twenty or thirty of her men went daily on shore; some rambled about the island, hunting and shooting; others were busy in bartering for provisions, washing linen, and other necessary employments: so that almost all that ship's company, consisting of two hundred and eighty men, were, in their turns, ashore upon the island in the day time; not one of whom, who returned to the ship at night, was taken ill, or suffered even the slightest indisposition.

Let all those who are apt, upon such occasions, to attribute these accidents to the irregularities of the sufferer, consider how little probable it is that the few who remained all night on shore could have been guilty of greater excesses, or have committed more hurtful irregularities, than the rest of the ship's company, who were ashore in the day-time and yet escaped in health. I must likewise observe, that the

springs of water in this island are, remarkably pure and wholesome; and though it lies directly under the equinoctial line, there is perhaps no spot of ground in the world more abundantly fruitful, or more pleasant and delightful.

The common opinion, that those people who sleep on shore in such places, are poisoned by the negroes, is so ridiculous, that it hardly deserves notice. If this is true, the negroes must be possessed of that poison only which communicates the endemic disease of the country, a fever, with its common consequences, the dropsy, jaundice, or cachexy: for such have I always found the condition of those people who supposed themselves to have received it.

Here I cannot help lamenting the untimely fate of those gentlemen, with several of whom I was well acquainted; who were thus, by an imprudent conduct, cut off in the flower of their age, and who, by continuing on board their ship, would in all probability have returned to England in perfect health. This was the case of all the officers and men belonging to his Ma-

jesty's sloop the Hound; who having performed the same voyage on this coast, arrived at St. Thomas before the departure of the Phœnix from thence; and by taking the precaution of having the ship quickly provided with wood and water, without permitting any of the men to remain on shore in the night, arrived at Spithead in perfect health; not one of the men or officers having been seized with that fatal sickness in the island of St. Thomas, which cut off the captain, and so many of the gentlemen and seamen belonging to the Phœnix.

In the year following, the Phœnix made another voyage to the coast of Guinea, and happened again to touch at this island in the sickly season, where she lost eight men out of ten, who had imprudently remained all night on shore. At the same time, the rest of the ship's company continued in perfect health, who after spending the greatest part of the day on shore, always returned to their ship before night. On board the Hound sloop, then in company with her, only one man died during

the whole voyage; the officers having been particularly careful not to permit any of the people to continue all night on shore in that place. This man was cut off by an obstinate intermitting fever, with which he had been first seized at Sheerness.

It may be urged, that there are frequent instances, of persons labouring under the prevailing sickness of a country, who have been carried on board ship, or into a better air, where the fever still continued, without any mitigation of its symptoms, and at last proved mortal. But what we particularly recommended, was the immediate removal of the patient, upon the first attack of his illness; that is, in less than 24 hours after being seized with it.

I am sensible that the attack of a cholera morbus, a dysentery, or even of the black vomit, may be so sudden and violent, as to admit but small hopes of a recovery from a change of air; but it must be allowed, that such violent and dangerous attacks are singular and uncommon. The want of success, from the too late ap-

plication of a remedy, or its failure in a few cases, cannot, with propriety, be objected against its general efficacy.

In Jamaica, and other places, persons recovering from fevers, are sent to the mountains for the re-establishment of their health. There, when they begin to breathe the cool, refreshing, and pleasant air, their debility, and all the complaints proceeding from it, almost immediately leave them.

When a weakly European leaves the coast of Guinea, he no sooner breathes the pure sea air, untainted with the land effluvia, than he finds his health mended, his appetite and his strength improved.

The change of air, in both these cases, proves the most certain means for the perfect re-establishment of health. Yet some whose constitutions have been much impaired, by the long and repeated attacks of sickness in a bad air, or by the violence of their disorders, may die at sea, or in the wholesome air of the hills.

These are certain facts; and a little cool reflection upon them will serve to establish it as an universal practice, in all diseases

proceeding from a bad air, immediately to remove the patient into an air more pure and wholesome.

This removal will be found of great benefit, not only in those diseases which proceed from such apparent ill qualities of the air, as have been often mentioned in these sheets, but in all diseases whose rage is confined to a particular spot. It would also be of benefit, in a general sickness, which may certainly be produced, independent of infection, by some latent intemperature of the atmosphere, the sources of which we cannot trace. It is not easy, from the sensible alterations in the air, as to heat, cold, moisture, &c. to account for the greater violence of diseases in some seasons than in others: such a difference in the air cannot always be ascertained, as would seem adequate to the production of such violent and obstinate diseases, or to their longer duration in one season than in another.

Thus during the years 1765 and 1766, remitting and intermitting fevers were more frequent in some parts of Hamp-

shire, than they had been remembered for many years past: they continued to make fresh attacks, even in the cold month of December; insomuch that at Christmas 1766, I had no less than an hundred patients, labouring under agues and fevers. In the years 1767 and 1768, without any apparent cause, they became much less frequent than in the preceding years; and, in the years 1769 and 1770, they seldom occurred, even in the worst situations. But whatever were the latent causes of those unusual fevers, at that time, they were evidently confined to some particular spots of ground, and to particular houses and situations; and the removal of the patients into a better air then proved useful, as undoubtedly in parallel cases it always will.

I will conclude with observing, that generally in a period of eight or ten years, a violent epidemical sickness breaks out among our factors and colonists, in several places in the torrid zone. This was the case at Antigua in the years 1765 and 1766, where fevers raged with such vio-

lence, as to cut off almost a sixth part of the white inhabitants of that island. If this fever was not contagious, and only the usual and annual epidemic of the island, raging with its utmost violence; as was that in Hampshire, during the same years; it seems highly probable, that had the sick, when first taken ill, been removed into the air of Monk's Hill, many would have been alive, who are now no more.

The facts, which are here barely set down, I leave to speak for themselves. The inferences are so obvious, of such extensive utility, and so practicable, that one would think nothing more was requisite to enforce their execution in all parts of the world.

SECT. V.

Directions more particularly for the Coast of Guinea. Unhealthy Settlements to be maintained by naturalizing the Natives. Military Establishments in such places to be recruited by Criminals. Necessary Directions for Soldiers, &c. on board of East India Ships.

I WILL add some few instructions with regard to the more unhealthy settlements on the coast of Guinea. The great mortality which Europeans suffer, in many places, on this coast, strongly points out that some of the young natives should be educated, and instructed in those branches of knowledge, which may qualify them for acting as factors or merchants in the most unhealthy settlements. Uncommon application, or great abilities in commerce, industry and integrity, may be properly rewarded. Those who possess such virtues, should be distinguished by particular privileges or honours; they should be natu-

ralized; should be allowed to rise to a certain rank in the government or army; and should be entitled to other privileges of British subjects.

At Benguela, Catchou, and other unhealthy places of Guinea, few Portuguese of the white colour are to be met with, except priests, and such as are banished to that quarter of the world. The Portuguese have instructed and civilized many of the blacks and molattoes in their African settlements, so that besides priests of a dark complexion, who are often men of letters, well versed in the Latin, Greek, and French languages; they have their principal factors, and many rich merchants, lawyers, surgeons, and others, of the same colour: all of these prove as faithful and good subjects to the crown of Portugal, as any in Lisbon.

It is remarkable, that the most healthy part on this coast remains, at this day, unpossessed by any European nation, the Banana Islands: these lie at a small distance from Sierra Leona: and according to the accounts I have had of the healthy tem-

perature of the air, which would still be improved by cultivation, it is probable, that Europeans might reside in them with tolerable safety during all the seasons of the year. Should the head-quarters of our military establishments in Africa be removed from Senegal and Gambia into these islands; and should they be made a privileged center of commerce, and a storehouse for trade; all the other settlements and out-posts of the army, might from thence with safety be visited by the proper officers and merchants, during the dry season of the year.

In order to recruit unhealthy military posts, where it may be requisite to keep soldiers the whole year, it might, perhaps, be advisable, that criminals be condemned to serve there for life, or for a limited term of years; and the punishment of desertion in the army, might, in some cases, be converted into that of banishment to those settlements.

It is said the King of Prussia seldom puts a soldier to death; but, according to the nature of the crime, condemns him for

a longer or shorter time, to work upon the fortifications; and thus renders him still an useful subject.

The Spaniards seldom send regiments to unwholesome places; such they generally garrison with exiles.

The annual loss sustained by the Dutch troops at Batavia, is chiefly supplied by a number of idle and disorderly persons picked up or trepanned in the streets of Amsterdam, especially foreigners and deserters from different nations. These recruits, yearly embarking in the Dutch East India ships, are a mixed company of different European nations, and do not, like the English regiments, consist chiefly of their own subjects, often ingenious mechanics and useful tradesmen.

If the English were thus to send deserters and criminals to the unhealthy places on the coast of Guinea, it would tend to preserve a number of useful subjects, and render such lives as are forfeited by law, still beneficial to their country. It might serve likewise to wipe off the aspersion of foreigners, which we hope is

unjust, that there are often more people executed in England in one year, than on the whole continent of Europe.

It is a melancholy, but a certain truth, that the maintenance of a military establishment at Senegal, for three years, during war, was formerly attended with an annual loss of above a thousand lives; and since the re-establishment of a military government there, the mortality has been very considerable. Most of the officers and soldiers who embarked for that part of the world died; and the governor, with the poor remains of his corps, may be said to have lived chiefly by repeated doses of the Peruvian bark.

I cannot help further observing, that the warm woollen clothes, and the black hat, which constitute the regimental dress of an English soldier, are altogether improper in hot climates. In those countries, soldiers, during fatiguing marches, while sweating under the oppressive load of arms and warm clothing, are apt, in the heat of the day, to be suddenly seized with a species of apoplexy. This is occa-

sioned by the scorching beams of the sun darted on the head, and absorbed by the blackness of the hat; and to prevent it, a white covering for that part seems requisite. To recover the patient from this fit, immediate bleeding is requisite; notwithstanding which, many die, and others remain deprived of their senses ever afterwards.

It may not be improper to subjoin a few directions, for the preservation of the numerous subjects of Great Britain, particularly the soldiers who are yearly sent to India.

As most of the ships who perform this voyage, are either newly built, or have been for some months unemployed, without fires or people on board, they become unwholesome. It would therefore be advisable, in East India ships, before they are fitted out, to keep constant fires of dried wood for six or eight hours every day, during a fortnight or three weeks. To evince the propriety of this advice, if, by way of experiment, a fire be made on the ballast, and the hatches shut, the

smoke which issues from the crevices, will be found to have an intolerable stench, proceeding entirely from the unwholesome dampness of the timbers.

To prevent infection, every recruit or soldier, when first sent on board, should be stripped of his old clothes or rags, before he is permitted to go between decks.

During so long a voyage, a sufficient stock of clothes, with changes of linen, and particularly a good bed, are absolutely necessary. When a number of such people are sent on board, such of them as, not having a bed to lie upon, are obliged to sleep in their dirty clothes on the decks, or on chests, will be seized with frequent chills, resembling the fit of an ague, and afterwards have an head-ach, great thirst, and heat on the skin, which may sometimes be attended with a cough, pains of the limbs, or other accidental symptoms.

These are the first appearances of that infectious fever, which often, in a greater or less degree, annoys ships crowded with soldiers. Some in the progress of the dis-

order will become yellow, others have spots on their bodies; but the head being greatly affected, and the low fever, clearly evince the nature of their disease.

As nothing will more effectually prevent this infection, than a sufficient stock of good clothes and bedding for each man on board; so, on the other hand, nothing will abate its progress so much as carrying out a supernumerary quantity of beds, linen, and clothes, for shifting the men. On the first appearance of this fever, and of the head being affected, the application of a blister almost certainly removes it; but from filth and dirt, the most efficacious remedies will be rendered ineffectual.

We have further to recommend, in East India ships, the same supply of necessaries for the sick as is granted in the royal navy. A man in a fever cannot live on biscuit and salt beef. Barley, rice, currants, sago, sugar, spices, and even wine, seem essentially requisite for the perfect re-establishment of his health.

If ships in their passage to India touch

at the islands of St. Jago, Madagascar, St. Johanna, or Mohilla, at Culpee in the river Hughly, Batavia, or Bencoolen, those persons who go ashore should always return before night; as these places have proved particularly fatal to Europeans who sleep on shore, at particular months of the year; and in all unhealthy places, when the ship lies near the land, for the preservation of the men, a fire should be kept burning on the forecastle all night, and the ship have her awnings spread in such a manner, that the influence of the fire and smoke may extend themselves over the whole ship*.

If the soldiers be landed at Calcutta, they may be first stationed on the high grounds in its neighbourhood, until seasoned to the country.

But if the men have been very sickly during the voyage, it is advisable to keep them separate for some time from other

* Further directions on this head, may be seen in my Essay on preserving Seamen.

persons, till perfectly recovered and free from infection; a precaution we would recommend to all our factories abroad; from a neglect of which, several of them have suffered.

END OF PART II.

PART III.

Advice to Europeans, in Cases of Sickness in hot Climates.

CHAP. I.

DIRECTIONS FOR THE CURE OF THOSE DISEASES WHICH ATTACK EUROPEANS IN HOT CLIMATES.

SECT. I.

Fevers.

IN addition to what is said in the Appendix to the Essay on preserving Seamen, and to the forms of medicines given in the latter editions of that work, I shall here subjoin some further directions and prescriptions, for the cure of those diseases which are most incident to Europeans in hot climates.

When a person, upon his first arrival in the West Indies, or any other country between the tropics, is attacked with a fever, no physician can tell what symptoms may occur in its progress; however mild it may appear in the beginning, yet

it will often afterwards be attended with discharges of bile, with a jaundice, or with symptoms of the most malignant nature. It is therefore always necessary, especially during a season of prevailing sickness, to endeavour, by the most efficacious means, to bring the fever as soon as possible to a remission, that the bark may be administered without delay.

It is to be considered, how far the violence of the fever in its first attack will admit of bleeding *: a few ounces of blood taken from the foot, have sometimes been found to relieve the pain of the head: but bleeding is in general to be used with great caution, and the repetition of it with still greater, in those climates.

The chief objects of attention in all such fevers, are the contents of the stomach and intestines. Immediately upon the patient's first complaint, and during the first hours of the fever, while perhaps he is only chilly, or complains of alternate fits of heat and cold, the stomach and in-

* See Appendix to the Essay on preserving Seamen.

testines should be cleansed, either by a vomit, by a purge of manna with tincture of senna, or by an oily and purging clyster.

The patient, immediately after cleansing the stomach and intestines, especially if the skin be moist, should take an antimonial draught*; which should be repeated every six hours. According to the state of the stomach, the dose of the antimonial medicine should be increased or diminished; taking care that it does not irritate or offend the stomach; to prevent which, especially if there be a tendency to vomiting, a few drops of tinctura thebaica

---

* Recipe Salis cornu cervi semi scrupulum, succi limonum drachmas tres, vel q. s. ad saturationem; aquæ menthæ vulgaris simplicis drachmas decem, tincturæ stomachicæ drachmam unam, vini antimonialis guttas x. ad xl. (vel potius in vicem vini antimonialis, tartari emetici quartam partem grani) syrupi è corticibus aurantiorum, drachmam unam, misceantur.

If the volatile alkali, though combined with the acid of lemons, be thought to decompose the antimonial preparation; the Vinum Antimoniale, or Tartarum Emeticum, may be exhibited without either an acid or alkali in the prescription.

must be added. If the irritation be violent, the antimonial may be omitted, and the opiate given in a full dose.

If the antimonial medicines, after thoroughly cleansing the bowels, produce a sweat, the patient will probably have an intermission of the fever, or at least a mitigation of its symptoms in twenty-four hours. The bark is then, if no symptom forbids, immediately to be given.

The next day a return of the fever is to be expected, unless a sufficient quantity of bark has been taken. In this case the antimonial medicines are to be repeated during the continuance of the fever; and if the head-ach be violent, or the patient be threatened either with a delirium or coma, a blister should be applied to the back. Recourse must be again had to the bark, as soon as the fever leaves the patient; and to that medicine, if he is much weakened by the preceding fits, some snake-root or camphire may be added.

If the antimonial medicines have not caused plentiful discharges by stool, as they often cause, a purge, combined with

the bark*, may be given occasionally, in the absence of the fever; copious bilious stools proving frequently critical and salutary.

Having made frequent mention of the virtue of antimonial medicines in fevers, in this and my former writings, I shall here take the opportunity of delivering my sentiments fully upon them.

Antimony appears to possess a virtue eminently febrifuge, which it frequently exerts independent of any evacuation.

The uncertain operation of antimonials, and the profuse evacuations which they have been in some cases known to produce, have been urged as objections against their use in fevers; but such objections arise merely from an injudicious administration of the medicine, or from an ignorance of the proper method of managing it.

Large doses of antimonials, or even

* Recipe corticis Peruviani purum contusi sesquidrachmam, aquæ libram unam, coquantur ad colaturæ uncias tres, cui adde salis cathartici amari drachmas sex, tincturæ corticis Peruviani simplicis drachmas tres.

smaller ones too frequently repeated, have sometimes brought on evacuations, which have sunk the patient; it is therefore always advisable to begin with a small dose, in order first to judge of its effects on the constitution.

Should antimonials, notwithstanding this precaution, prove unexpectedly violent in their operation, opium will always effectually check them. The opiate may be given either alone, to restrain evacuations already too violent, or it may be combined with the antimonial to prevent them. An antimonial thus guarded, may be administered with success, even in fevers attended with a purging. An opiate given after the too severe operation of an antimonial, checks all further evacuation, recruits the patient's exhausted strength, and in such a case seems requisite to the entire removal of the fever; it allays the febrile anxiety, and brings on a state of perfect ease, without which the success of antimony would not be complete.

Some preparations of antimony contain this febrifuge virtue in a high degree, as

Tartarum Emeticum, and Dr. James's Powder. Others contain it in a less degree, as Vinum Antimoniale.

By an order from the Admiralty, the Navy of England, and the naval hospitals, were supplied with a medicine called Dr. James's Fever Powder; with instructions to observe and report the effects of it in fevers. In consequence of that order, this powder has been given at Haslar hospital, in various cases of fevers, to several thousand patients. A third or fourth part of the powder contained in one paper was commonly prescribed at first, and repeated every four hours. When the whole quantity in a paper, which varies in weight from 24 to 30 grains, had been thus administered without producing any sensible effect, half a paper was given in one dose, and repeated every six or eight hours. After which, if the patient still remained costive, and it was judged that stools would be useful, a whole paper was administered at once; that quantity having been frequently found a mild and efficacious purge, even after the recess of the

fever. If the patient could swallow a bolus, this powder was mixed with conserva fructus cynosbati, except when there was a diarrhœa, or too frequent stools; in which case it was administered in philonium Londinense. When there was a subsultus tendinum, four or five grains of camphire were added to the powder; and other medicines occasionally. This powder was given with most success when the head was affected with violent pain or stupor, and often when the patient was delirious or comatose, or both: in which last state, after he had continued several days, there were many instances of an apparent and salutary effect from this medicine, even when it acted merely as an alterative. It is however to be observed, that when this powder was given, nothing had been omitted, on account of its administration, which could promise relief or safety to the patient; bleeding, blistering, and all other requisite evacuations were used, as if no such powder had been given. But as fevers differ much in their nature, one remedy, or

one powder, cannot be universally successful in all fevers: bleeding is known to be of great benefit in some, and opium, it will soon be shown*, is of equal benefit in others; yet the effects of bleeding and opium are so entirely opposite to each other, that the mistake of applying one of those remedies where the other is proper, must be attended with bad consequences: in the same manner, the promiscuous use of this powder, in the hands of the ignorant, will render it doubtful, whether such a remedy would do most good or harm; and physicians seldom venture to prescribe a medicine of a composition unknown to them, being thereby less able to correct any bad symptom which might accidentally proceed from its use. So upon the whole, this medicine, until made public, is not likely to be of general benefit to mankind. The Tartarum Emeticum, from repeated trials, I find to be possessed of a virtue similar to that of Dr. James's Powder. Like that powder, it requires also to

* See the Appendix.

be occasionally compounded with other medicines, with camphire or nitre, to improve its efficacy, or with opiates, to prevent its irritation of the stomach and bowels. Half a grain* of it will be quite sufficient for the first dose, which may be repeated every six hours; and, to produce evacuations, may be occasionally increased.

The Vinum Antimoniale, upon several comparative trials, I have found to be possessed of a less degree of febrifuge virtue than the Tartar Emetic. I have however sometimes prescribed with success the Vinum Antimoniale in large quantities, when a patient in a fever had continued for several days in a doubtful state of recovery, comatose, and insensible, with a continual stupor on the brain, and a violent struggle and oppression of the vital organs. In this case, I give a drachm of it diluted with water, and repeat it every two hours, with

---

* Recipe Aquæ Alexiteriæ simplicis drachmas decem, Aquæ Alexiteriæ Spirituosæ, Syrupi e Corticibus Aurantiorum, singulorum drachmam unam, Tartari Emetici granum dimidium. Misce. Fiat haustus, cui pro re nata adde Nigri grana tria.

the increase of half that quantity, until an ounce is taken, or some sensible effect produced. If it brings an inclination to vomit, this evacuation should be promoted by drinking warm water; and if there be a tendency to a looseness, forty drops of the tinctura thebaica should be added to each ounce of the wine.

As to other antimonial medicines, such as the Kermes Mineral, so much used in France, and the Antimonium Diaphoreticum, I have had very little experience of their effects.

A caution is requisite, to avoid the addition of an alkali to an antimonial preparation, as it would decompose the antimony in most of its preparations commonly used: hence the testaceous powders, frequently combined with Tartarum Emeticum, would seem to impair the efficacy of the medicine. Let me add, that antimonial medicines being of importance, ought to be prepared with the greatest exactness, and used when newly made, as long keeping, or an exposition to the air, greatly injures their virtues.

These are the most proper methods of treating of Europeans, upon the first attack of this fever in a warm climate, that a perfect intermission, the most desirable crisis, may be obtained; when the bark may be safely and plentifully administered.

But on the other hand, if the patient, upon being first seized, makes no complaint of his indisposition; if, as is too often the case, he supposes it solely the effect of drunkenness, debauchery, or intemperance, or ascribes it to hard labour or violent exercise when exposed to the heat of the sun, and thence for some days neglects to make his condition known, until a yellow colour shews itself in the eyes, his case is already become extremely dangerous. The anxietas febrilis, or a great oppression, with the sensation of heat and pain at the pit of the stomach, come on, and frequently precede copious discharges of bile, by vomit or by stool: they are also the forerunners of a jaundice. Sometimes the region of the liver becomes swelled, hard, and painful. Strong and constant convulsions of the diaphragm, intercostal muscles

and stomach, follow these symptoms, and are accompanied with a vomiting at first of green offensive bile, and afterwards of black dissolved blood, resembling the grounds of coffee, which is succeeded by bleeding at different parts of the body, a phrensy, an universal gangrene, and death.

Instead of giving a particular description of this fever, we shall refer to the accounts already given of it in several parts of this work, and to those of Dr. Robertson, Dr. Lind of Windsor, and Dr. Rouppe*; where the appearances of this fever are described as it occurs on the coast of Guinea, in the East Indies, and in the West. We will farther subjoin an original account of the yellow fever, drawn up by Dr. Bruce, a native of Barbadoes, and a physician who long practised in that island†.

* See Chap. I. Sect. II. Chap. III. Sect. II. Chap. IV. Sect. II. of Part I.

* Account of the yellow fever, by Dr. Bruce.

"Febris putrida, apud *Nostrates* dicta flava, quoniam plerumque, sub finem morbi, cutis flavedine suffunditur, ab Hispanis Vomino preto, et a

As to the prognostics, if a jaundice makes its appearance soon, it is a bad

---

Gallis Maladie de Siam vari nominatur. Advenas ex climate temperato in Indiam utramque corripit; et eos, qui post labores diuturnos et exercitium vehemens, sub solis ardoribus seroribus nocturnis exponunt: adjecto præsertim liquorum, ut dicunt spirituosorum abusu . . . . In omni anni tempestate, sese offert hic morbus; symptomata autem graviora observantur, ubi calor magnus cum multa humiditate conjungitur.

"Incipiens dignoscitur languore, dein nausea quadam, et vertigine; paulo post accedunt algor et horripulatio, perraro tamen rigor: quos excipiunt ardor vehemens et intensa febris, cum summo capitis et lumborum dolore: rubet os totum, ardentque oculi; quæ signa, adjecta anxietate et præcordiorum oppressione, pathognomonica dicuntur. Pulsus adest velox, eltus, quandoque pulsitans, sed mollis; in quibusdam velocissimus, et plenus, cum respirandi difficultate. Cutis aliquando sicca est, in primis præsertim morbi diebus, sed frequenter magis rorida. Sanguis etiam ingruenti morbo missus, colorem exhibit floridum, rutilum, et quasi rarefactum, crassamento vix cohærente, sero luteo croceo: Flavescit urina. Somnus parvus est, absque levamine; jactatio frequens. Sitis in quibusdam summa est, vix adeo in aliis magna. Lingua in principio muco albescenti obducta, squalescit circa finem morbi, et in media s[illegible]bra, coloris primum rufi, dein quasi nigrescentis, horrida apparet.

symptom. Livid spots, which sometimes shew themselves, portend death. If the

---

Persistunt hæc ad diem tertium, aliquando quartum et ulterius. Cum vero causæ antecedentes acerrimæ sint, labefactuntur ægri vires, et intra viginti quatuor horas, vel citius moritur. Quo citius his, primus absolvitur gradus, eo malignior solet esse morbus.

"Tertiam vel quartam circiter diem deficit pulsus, sitque lentus, etiam solito magis, adeo ut absenti insuper cutis ardore, omnia in vado esse jactent indocti; falsa tamen spe tenentur, nam cito post omnia in pejus ruunt. Invadit coma, cum deliriis interruptis; vomitus porraceus, sudor gelidus, et deliquia; oculorum rubor in colorem fuscum mutatus, ad flavum accedit; sic et circa os, tempora, collum, dein per totum corpus flavedo hæcce diffunditur; mali ominis signa; ecce enim coma altum, pulsus vermicularis et intermittens, hæmorrhagiæ, respirandi summa difficultas, jactatio perpetua, subsultus tendinum, extremorum frigus, convulsio, mors . . . . Observatu dignum est, hanc cutis flavedinem in quibusdam obrepisse post septimam et ultra diem; tumque vix adeo mali ominis esse. . . . . . Hæmorrhagiæ variis e corpore locis proveniunt; e naribus scilicet, ore, oculis, atque cutis poris; sanguis per sedes ejicitur, quasi niger, sic et vomitu. Urina icterica, nigrescens. Apparent notæ lividæ, et in membris gangræne. Post mortem corpus livet, juxta præsertim præcordia,

skin continues very dry and rough, the case is dangerous; and the longer it con-

---

quæ in principio sedes esse morbi videbântur, hepar scilicit et ventriculus: in putredinem post hæc omnia rapiuntur.

"Exsurgunt indicationes.

"1mo, Ut magnus et rapidus fluidorum motus, cum febris violentia minuatur, in primo morbi gradu.

"2do, Ut e corpore eluatur putrida quævis materia, sic ut putrescens humorum disposito precaveatur, in omnibus morbi gradibus.

"In incipiente igitur febre, quoniam plerumque pulsus velox et plenus sit, mittatur sanguis, pro ratione virium et ætatis: repetita perraro juvat missio. Si vero pulsus adsit debilis incipiente morbo, vix detrahendus est latex vitalis.

"Cum ad secundam indicationem acceditur, caute procedendum est. Ventriculus enim inflammatus, vel summe irritabilis, sæpe lenissima ægre fert medicamina: qua re emetica minime exhibeantur, nisi perpetuam vomitionem inducere velis, et gangrænam: præterea morbi fomes in intestinis, sive in hepate ad ductus biliarios inhærescens, multo magis feliciter catharticis lenioribus educitur. Æger, si adstringatur alvus, quod in principio sæpe fit, eccoprotica statim adeat, qualia sint decoctum tamarindorum et chrystalla tartari. Si his non ausculfet venter, auxilio detur enema quoddam emolliens et catharticum. Sæpe tamen cum eveniat

tinues in that state, the greater is the danger: such patients seldom recover,

---

in primis morbi diebus, ut quæcunque cathartica, quamvis lenissima, ventriculo rejiciantur, fugiendum hoc in casu semper est ad enemata fortiora, donec probe soluta sit alvus: postea remanente adhuc nausea, vel quidem auctis vomendi conatibus, præcipiatur extracti thebaica granum, vel grana duo, sub pilulæ forma. Hac ratione, usu scilicet enematum et opiatorum, trucem hunc morbum, haud semel in praxi debellavimus.

"Tertium circiter diem, labitur pulsus, &c. fortiter nunc robur est sustinendum, medicamentis cardiacis, victuque idoneo, levi, et eupeptico.

"Cortex Peruvianus magni foret hic usus, nisi nauseam moveret, vires tamen in quibusdam experti sumus ubi aderant hæmorrhagiæ, et alia summæ putredinis indicia, sed levis quidem in vomitus propensio.

"Camphora, quæ in febribus putridis, lentis, optimum remedium est, huic non multum opitulatur: plerumque enim nauseam movet, quandoque tamen profuisse læti observavimus.

"Radix serpentariæ Virginianæ, valde antiseptica est, et fere semper levaminis multum ventriculi ægritudinibus adferre solet; leve autem adsit infusum. Recipe radicis serpentariæ Virginianæ drachmas duas; infunde in aquæ bullientis libra; colaturæ adde elixiris vitrioli quantum sufficit ad gratam aciditatem, et dentur cochlearia duo vel tria

though the pulse may give hopes, and the other symptoms also be flattering.

---

sæpissime. Infuso huic immisceatur vinum Madeirense pro re nata.

"Præscriptis omnibus ad ventriculum roborandum frustra tentatis, spes ægri julepo sequenti restoravimus. Recipe aquæ menthæ simplicis et tincturæ stomachicæ partes æquales. Sumat cochlearia duo vel tria quaque hora, vel semi-hora.

"Persistente adhuc nausea, recurrendum absque mora est ad extractum thebaicum (post sedatum ventriculum exhibeatur enema catharticum) cui medicaminis generi fere semper hoc in morbo plurimum insistendum est; sic enim feliciter deorsum elicitur morbi fomes, atque materia feculina putrescens; ventriculusque levatus diætæ dein, et medicinæ, auscultat.

"Diæta sit levis, ex vegetabilibus antisepticis deprompta; minime vero ex animalibus, quæ ad putredinem propius accedunt. Sit potus acidulus. Decocta, vel infusa panis tosti in aqua, cum succo limonum vel tamarindorum, juvant, adjecto, ubi langueant vires, vini pauxillo. In vinis primum locum tenent Madeirense et Rhenanum. Hæc et potui esculentisque immista, parca simul copia, sed sæpissime dentur.

"In ultimis morbi diebus, cum summe langueant ægri vires, adsitque extremorum frigus, aliaque mali ominis indicia, augeantur adhuc medicamenta cardiaca. Recipe radicis serpentariæ Virginianæ drachmas duas, croci Anglicani semi-

Many have a good pulse in this fever, even a few hours before death. If the

---

drachmam, infunde in aquæ bullientis quantum sufficit ad colaturæ uncias sex; Adde vini Madeirensis uncias quatuor, tincturæ stomachicæ uncias duas, dein misceantur. Capiat cochlearia duo vel tria singulus quibusque horis. Huic pro re natâ addantur confectio cardiaca, vinum croceum, camphora, tinctura corticis Peruviani. Absint, quæcunque sanguinem solvunt, quamvis cardiaca dicta, quales sunt sales volatiles, et spiritus cornu cervi vel ammoniaci, neque extremis admoveantur epispastica, quia sanguinem mire solvunt hæmorrhagias atque gangrænam ferunt.

" Præter salutifera diota, in quibusdam opus est nervinis, ubi nimirum ex summa materiæ morbosæ acrimonia fit nervorum distentio, urgentque spasmi, cum singultu, hoc in casu, nulla, moscho et castoreo cum opio, præstantiora.

" Sub finem morbi, prægressis dissoluti sanguinis notis, pacata postquam visa fuissent symptomata graviora, vomitus quandoque ex inopino recrudescit; et miseros diarrhœa biliosa stipatos ad orci fauces pellit; quosdam vero feliciter servatos novimus hac ratione. Recipe corticis Peruviani contusi semunciam; coque in aquæ fontanæ unciis duodecim; sub finem coctionis adde radicis serpentariæ Virginianæ florum chamœmeli, singulorum drachmas duas; fiant unciæ sex colaturæ; cui adjicer balsami sulphuris terebinthinati guttas quinquaginta, tincturæ thebaicæ guttas octo-

vomiting is constant; if what is thrown up turns to a dark colour, and the patient hiccups often, the case is almost desperate. If the face be greatly flushed, the vessels of the tunica adnata become red, as in an ophthalmia, and there be a phrensy, the patient will die in a very short time, especially if the skin be dry.

On the other hand, if the head continues unaffected, the pulse becomes soft, the pains, oppression on the breast, and retching, be somewhat abated, by bleeding or other means; if the irritation of the stomach be removed by gentle purging, and the skin is soft and moist; if the patient becomes composed, and is relieved

---

ginta; gelatinæ amyli uncias duas; misce, fiat enema statim injiciendum, et diu retinendum. Si vero enema antisepticum et anodynum fortiter minus opituletur, præscripta simul est in quibusdam pilula sequens. Recipe extracti corticis Peruviani grana quatuor, camphoræ, extracti thebaici, singulorum granum unum. Misceantur. Fiat pilula secundis vel tertiis quibusque horis sumenda, donec sistantur paululum motus ventriculi et intestinorum.—Enematis ejusdem et pilulæ vires in dysenteria putrida, adstante jam sphacelo, haud semel experti sumus."

from, that oppression of spirits which before distressed him; it is probable that he will recover; all these being salutary appearances.

As to a crisis of the fever, it may happen in different ways, without any respect to the critical days enumerated by the ancients. It sometimes happens by sweat. But the most favourable and certain, being the best termination of all fevers of this sort, is when it terminates in an eruption of small boils on the surface of the body. A diarrhœa proves also a favourable crisis. A bleeding from the nose, or from an artery, in the beginning of the fever, has sometimes saved the patient's life; but hæmorrhages, when profuse, or happening towards the end of the disease, are fatal. Buboes, and a swelling of the parotid glands, are unusual, though salutary symptoms.

Would the potio frigida, so much recommended by the ancient physicians, and administered in fevers by many of the moderns in many parts of Europe, be serviceable in this disease?

In the neighbourhood of unwholesome, damp, and woody places, during hot weather, a fever often makes its attack with a delirium. In this case, after bleeding, if indicated, antimonial medicines and blisters are chiefly to be depended upon; together with the immediate removal of the sick into a purer air. At the same time nitre may be given in large doses well diluted; or, if that be nauseated by the patient, the spiritus nitri dulcis*, which will be found to sit easier on the stomach, and the nitre† may be administered in clysters. The feet should be frequently bathed or fomented with warm water, and sinapisms‡ applied to them, if the case is obstinate.

---

* Recipe Aq. alexiteriæ simpl. drach. vi. aq. alexiteriæ spir. drach. i. succi limon. (sale absinthii saturati) drach. iij. spir. nitri dulcis drach. i. syr. simpl. drach. ij. M. fiat haustus quarta quaque hora sumendus.

† Recipe Aq. hordeatæ unc. x. nitri ℥ ss, albumen ovi unius M. fiat enema bis terve de die injiciendum.

‡ Recipe Farinæ avenaceæ et pulv. sinapios partes æquales, aceti q. s. M. fiat cataplasma pro pedibus.

In cases of violent delirium, especially if attended with convulsive twitchings, musk* alone, or with cinnibar, is proper. If there be worms in the stomach or intestines, 10 or 15 grains of calomel may safely be given. Towards the end of the fever, when a constant inquietude and long want of sleep distress the patient, soporific medicines are beneficial.

Leeches applied to the temples, and cupping glasses to the nape of the neck, have also proved serviceable.

Cream of tartar dissolved in boiling wa-

---

* Recipe Moschi gr. x. and xv. sacchari albi drach. i. terantur simul in mortario, dein adde mucilag. gummi Arabici scrup. iv. aq. fontanæ drach. xiv. aq. alexiteriæ spir. drach. ij. M. fiat haustus sexta quaque hora sumendus.

Recipe Cinnabaris gr. xij. confect. cardiacæ q. s. fiat bolus sextis horis sumendus, cum haustu moschato suprapræscripto.

Recipe Capitum papaverum alborum drach. vi. coquantur ex aquæ font. lib. ij. ad dimidiam, addendo sub finem cocturæ rad. serpentariæ Virginianæ contusæ, rad. contrayervæ, āā drach. ij. coletur liquor fortiter exprimendo, postquam refrixerit; et dentur unc. ij. omni quadrihorio, additis nonnunquam elixir paregorici gutt. x.

ter, makes an excellent cooling drink in these fevers; to which manna and sugar may be occasionally added.

If there appears a swelling of the parotid gland, the suppuration of it should be promoted by poultices, and the patient's strength supported by wine.

SECT. II.

The Dysentery and Cholera Morbus.*

THE dysentery is also a disease to which Europeans are very subject in hot climates. We indeed meet with few instances of an epidemical malignant fever, which is not in some cases accompanied with a flux.

The flux sometimes appears by itself, often ushers in the fever, more frequently accompanies it. When alone, it is generally milder, and less mortal than when attended with fever. A necessary distinction to be made between fluxes in all cli-

* This disease, in the East Indies, where it is very frequent and fatal, is called the Mordechin.

mates is, that those which attack persons in perfect health may be considered as original diseases; and those which attack persons much weakened by a fever, or otherwise reduced to a very low condition of body, are properly symptomatic, proceeding chiefly from weakness, of which the flux is equally a symptom and a proof.

When a violent dysentery seizes a person in health during warm weather, the following are the most proper means of relief. Bleeding should first be used with great caution; a few grains of ipecacuanha be given to operate as a vomit, and an opiate after its operation; a full dose of sal catharticum amarum be administered, to cleanse the intestines; and afterwards recourse be had to ipecacuanha, in very small doses, with opiates and rhubarb: when the pain in the bowels and fever are gone, and the purging much abated, the cold bath will contribute greatly towards a perfect re-establishment of health. Sometimes at the beginning of this disease, especially when accompanied with fever, relief has been obtained from dissolving an

ounce of manna and two grains of tartar emetic in a pint of common emulsion, with the addition of half an ounce of syrup of white poppies; and giving an ounce of the mixture every hour, until the bowels were sufficiently emptied; after which an opiate was given; and then a mixture of the bark with opium, to complete the cure.

But when the patient is seized with a cholera morbus, when the dysentery on its first attack is accompanied with violent retchings or a severe vomiting, other medicines must be prescribed. In the first place, the stomach must be evacuated of its contents, by for a short time promoting the vomiting with diluent drink and some very gentle stimulus, as by large draughts of a weak deooction of chamomile flowers, or by warm water, with the addition of a few drops of spirits of hartshorn, which tends to remove the cramps and spasms with which the patient at such times is often distressed. The decoctum chamœmeli must be administered in clysters, until the intestines be likewise perfectly

cleansed. After these an opiate* must immediately be given. If the opium be vomited up, it must be given by way of clyster in double the quantity, with four or five ounces of warm water. It is to be repeated at an interval of six or eight hours.

When these methods have failed to stop the vomiting, I have often found success from the external application to the stomach of warm wine and spices, or of opium and camphire †.

A drop of the oil of cinnamon taken upon a piece of sugar, musk, mint, some-

* ℞ Salis absinthii scrup. i. succi limon. unc. ss. vel q. s. ad saturationem, aq. menthæ vulg. simp. drach. x. aq. menthæ vulg. spir. drach. ij. syrupi papav. alb. drach. i. tinct. thebaicæ gutt. xxx. M. Vel ℞ Opii puri gr. i. olei menthæ piper. essential. gutt. i. M. fiat pilula.

† ℞ Linimenti saponacei drach. vi. tincturæ thebaicæ drach. ii. Misce.

℞ Camphoræ (olei olivar. unc. ij. solutæ) unc. i. tincturæ thebaicæ unc. ss. Misce.

℞ Emplastri è cymino unc. i. ss. opii drach. ss. camphoræ, drach. i. olei essentialis menthæ vulgaris, gutt. x. olei macis per expressionem q. s. ut fiat emplastrum molle, regioni ventriculi applicandum.

times elixir vitrioli and spiritus nitri dulcis, are the most proper internal medicines to stop the vomiting after the intestines are cleansed. The patient should be allowed for drink, mint tea, toast and water, al-mond emulsion, or sometimes chicken-broth. But if the vomiting continues for some time to be very obstinate, and the bowels be sufficiently cleansed, the safety of the patient will entirely depend on bathing the stomach well with opiates and camphire, and on administering tinctura thebaica in clysters: these clysters should be repeated, with an increase of the opiate every six hours, until the vomiting and pains cease, or the patient's head be affected by it. In obstinate and dangerous cases I have sometimes been obliged to increase the quantity of tinctura thebaica to half an ounce in the clyster, before the spasms could be removed. But previous to giving opium in so large a quantity, I generally ordered the feet to be bathed, and applied blisters to the legs; or if a violent and fixed pain in the stomach, or in any part of the abdomen, had continued

from the beginning of the disease, and was not removed by bleeding and warm fomentations, I then applied a blister to the seat of that pain.

In both dysentery and cholera morbus, when the whole abdomen is hard, tense, and painful, immediate ease is often procured by fomenting it with a decoction of chamomile and elder flowers, together with some heads of white poppies, sprinkling the flannels dipt in the fomentation with camphorated spirit of wine, immediately before they are applied.

In some dysenteric cases, opium proves most effectual when given by the mouth, in others when in clysters.

For other anti-dysenteric medicines, see Formulæ Medicamentorum, annexed to my Essay on preserving Seamen.

SECT. III.

The Dry Belly-ache.

THE principal relief in this painful disease, is to be expected from persisting in

the use of opium, both by clysters*, and by embrocations† on the belly, until the spasms and pain are somewhat mitigated; and then from administering cathartic medicines by the mouth, so as to procure stools.

When there is a frequent inclination to vomit, an emetic may be given, which will sometimes also procure a stool. By the operation of this, bile is often thrown up from the stomach; but the stools are not bilious; they are generally hard and very costive; purging clysters ought, therefore, after the emetic, to be administered every hour; and, at bed-time, opium given, to the quantity of two or three grains.

When there is not any great inclination to vomit, and the stomach will retain medicines tolerably well, which is generally the case in this disease, from two to four or five table-spoons of the oleum palmæ christi may be taken every hour, until a

* ℞ Aquæ tepidæ unc. vi. Tincturæ thebaicæ drach. unam—ad semunciam. M. fiat enema.

† ℞ Linimenti saponacei unc. iij. Tincturæ thebaicæ unc. ij. M.

stool be procured; or doses of sal catharticum amarum, with manna and infusion of senna, may be taken every hour, with the same intention. In either case, the operation of the purgative will be greatly promoted by the warm bath.

Some have been said to receive benefit from a mixture consisting of equal parts of olive-oil, lime-juice, and Holland gin, of which two spoonfuls were taken every half hour, until the pains were abated by a plentiful sweat. Several other medicines for this disease may be seen in the Formulæ Medicamentorum, annexed to my Essay on preserving Seamen.

To prevent a relapse, which is very frequent, the patient must be kept in a lax state for some time afterwards, by the daily repetition of the same purgative medicines, or by the gum pill with aloes*; and if distressed with rheumatic or paraly-

* ℞ Pilulæ gummosæ gr. xv. camphoræ, aloes Soccotrinæ ana gr. iv. elixir aloes q. s. fiant pilulæ iv. quo. tidie sumendæ.

tic complaints, nervous and strengthening medicines should be taken*.

When the vomiting is incessant, the pain very acute, and nothing can be retained upon the stomach, Sir John Eliot observes, "That stools may be procured, and all the uneasy complaints removed, by giving purgatives, joined with opiates and camphire†. At the same time emollient clysters should be given, and the belly fomented with the fotus communis, to which soap ought to be added, when the constipation is remarkably obstinate."

---

* ℞ Balsami Peruviani (in vitello ovi soluti) drach. ij. aq. font. unc. vi. tinct. valerianæ simp'. unc. i. spir. lavendulæ comp. semunc. syrupi balsamici drach. vi. M. Dosis unc. i. ss. bis die.

Vel ℞ Salis succini ℈ ss. salis cornu cervi gr. vi. aquæ font. drach. x. aq. juniperi comp. drach. ij. syr. e corticib. aurunt. drach. ij. M. fiat haustus octava quaque hora sumendus.

† ℞ Pilulæ ex colocynthide simp. scrupulum unum, calomelanos, camphoræ, singulorum grana quatuor, opii grana duo; fiant pilulæ numero sex quarum duæ assumantur quaque hora, donec bis terve soluta fuerit alvus. Camphora cum guttulis aliquot spiritus vinosi rectificati teratur, ut mollescat, atque opium eodum modo emolliatur, his peractis, perfecte misceantur cum reliquis.

The dry belly-ache, though one of the most painful and excruciating distempers, seldom proves mortal, unless it has been occasioned by sleeping on the ground exposed to the night air, or by drinking immoderate quantities of newly distilled spirits, which are too frequently made use of in the beginning of the disease.

SECT. IV.

The Tetanus and Locked Jaw.

THE tetanus, emphrosthotonus, and opisthotonus, are most frequent in hot countries; in all of them opium seems to be the principal remedy.

In these diseases, opium may be administered in very large quantities. It should be given at first in a full dose, and be afterwards repeated every hour, with an increase of the quantity in proportion to the violence of the spasms, until relief be obtained. In a case of the episthotonus at Haslar hospital, the extractum thebaicum was given, to the quantity of a scruple,

in less than twenty-four hours. In another case, it was remarkable, that an application of opium and camphire to the feet, removed the spasm, and upon taking off the application, the spasm soon returned with its former violence: an effect which was several times produced by the repeated application and removal of these medicines.

The spasm most fatal to Europeans in hot countries is the locked jaw, which is the frequent consequence of an amputation, or even sometimes of a slight wound, in those climates. Towards the end of the former war, at one of the most remarkable sieges in the West Indies, that of the Havannah, five persons in six, whose limbs were amputated, died of this spasm.

There does not appear to be any fault in the blood in such cases, nor any general disorder in the solids affecting the principles of life, this being merely a local muscular spasm. Hence it is to be hoped, that, by a sufficient number of experiments, an effectual method may be discovered, of preventing or removing so dangerous a

symptom; for this purpose I beg leave to offer two suggestions.

As the locked jaw most frequently makes its appearance in warm weather, and in hot countries, would not an immediate change of air prove the means of saving the patient's life? And where it is impossible to remove the patient into a cool air, would not some benefit be derived from the immersion of the whole body, or part of it, in cold water; adding frequently sal ammoniac or nitre, in such quantities; that by their continual solution the water may acquire the utmost degree of coldness? Agreeable to this, my friend Dr. Wright has of late very successfully employed at Jamaica, the affusion of cold water on the naked body in cases of locked jaw.

As the internal use of opium has been frequently found ineffectual to remove this dreadful symptom, would it not be greatly assisted by the external application of a strong solution of opium to the wounded part, and even to the seat of the spasm, in

such a quantity as to bring a numbness and paralysis on those parts?

The use of mercurial ointment in the tetanus and locked jaw, has of late, I am informed, been attended with considerable success. As soon as a salivation is produced, it is supposed the cure is accomplished; and, in order to procure this more speedily, the patient is put into the warm bath: opium is given at the same time, to procure sleep. A more particular account of this has lately been laid before the public by Dr. Donald Monro.

SECT. V.

The Barbiers.

THE Barbiers is a species of palsy, most frequent in India. It distresses chiefly the lower class of Europeans; who, when intoxicated with liquors, frequently sleep in the open air, exposed to the land winds. Its attack is generally sudden, and entirely deprives the limbs of their motion. Some-

times all the extremities of the body are affected, sometimes only part of them.

The natives of the country have a method of putting the patient into a hole dug in the ground, and covering him with sand up to his neck: this is done in the middle of the day, and he remains there as long as he can bear the heat of the sand, which is considerable. Camphire and a decoction of Guaiac wood have sometimes produced a good effect; also the expressed bitter oil of the mergoose, an Indian plant. But notwithstanding the use of the most powerful nervous medicines, the patient generally continues paralytic for some months, unless he is removed into another air.

On the Malabar coast this disease is most violent and frequent, and attacks both natives and strangers, especially in the months of December, January, February, and March. During these months the land-winds blow every morning about sun-rise, from the neighbouring mountains, with remarkable coolness; and such, as being tempted by the serenity of the

season, sleep exposed to these winds, are often suddenly seized with a very painful sensation in the periosteum of the arms and legs. In persons of a good constitution, this pain abates as the day advances, and as the air becomes warmer; but in others it continues for a considerable time, attended with a weakness of the knees, and uneasy sensation in the calves of the legs and soles of the feet, especially on any attempt to walk. This is scarce ever cured by medicine till after the shifting of the monsoon, unless the patients can be removed to the coast of Coromandel, or to any place to the eastward of the Balagat mountains, where, by the change of air, they quickly recover.

CHAP. II.

DIRECTIONS FOR EUROPEANS ON THEIR RETURN HOME, WHOSE CONSTITUTIONS HAVE BEEN IMPAIRED ABROAD.

SECT. I.

Directions for those of a relaxed and bilious habit of Body.

PEOPLE whose health has been impaired abroad in hot climates, and who propose to revisit England, should endeavour to arrive in the beginning of summer, as they will find the winters of Great Britain, on their first arrival, too piercing and severe for their constitution.

If they have lost their complexion, and have a yellow tinge in their eyes or countenance; if the stomach be much weakened, the digestion bad, and the constitution enfeebled and relaxed; if they have had frequent fits of the cholic; or if an

hardness remains in the liver, spleen, or any of the bowels, they ought immediately to go to Bath. They will find the Bath waters an excellent restorative, and well adapted to these complaints. They will also find them proper for a contraction of the limbs remaining after the dry belly-ache.

Those who are subject to bilious cholics and obstructions, occasioning a hardness of the abdomen, frequent costiveness, and a vomiting at intervals of pure bile, should take a tea-spoonful of elixir aloes morning and evening, and twenty or thirty drops of elixir vitrioli twice or thrice a day, upon an empty stomach. When there is a pain, hardness, and swelling of the liver, the part should be anointed with mercurial ointment, and mercurial pills* be taken,

---

* ℞ Argenti vivi, pulveris rhabarbari, saponis albi Hispanici, singulorum partes æquales: tere argentum vivum cum mucilagine gummi Arabici, donec globuli mercuriales non amplius appareant; dein adde saponem atque rhabarbarum, et cum mucilagine gummi Arabici in massam pilularem redige; e singulis drachmis fiant pilulæ duodecem, quarum capiat æger duas vel tres mane et vespere.

in such small doses as not to affect the mouth, or weaken the constitution by purging.

There are however three cases of such patients, which forbid the use of the Bath waters, and which require very different means of relief: a consumptive habit of body, a dropsical habit, and an habitual flux.

SECT. II.

Directions for those of Consumptive and Dropsical Habits of Body.

Persons of a consumptive habit bear ill too sudden a change from a hot to a cold climate. I would advise such, before they land in England, to pass a winter at Lisbon, Naples, or the South of France.

It would exceed much the limits assigned to this Essay, to give a full account of the treatment of persons in general of consumptive and dropsical habits; I confine myself chiefly to that peculiarity in their situation, which arises from their re-

turning under such circumstances from a hot to a cold climate.

The proper medicines for this complaint, I formerly gave under the article Phthisis, in the Formulæ Medicamentorum, annexed to my Essay on preserving Seamen. I may farther observe, that sometimes the hot-well waters of Bristol, a voyage at sea during the summer, and issues in the affected side, have been attended with benefit.

In habits exhausted by a long residence in warm climates, attended with hardness of the abdomen, bilious purging stools, and hectic fever, Sir John Eliot informs me, "that he has often succeeded by laying aside the use of opiates, astringents, and strengtheners, and putting them upon a diet of milk and fruits; at the same time giving the sal polychrestum as an alterative; or if it produced too much irritation in the stomach and bowels, giving it with gum Arabic. During this course, and whilst the hardness remained, the belly was rubbed, night and morning, with a strong decoction of the cicuta made in oil.

In all consumptive cases, where the fever was considerable, Sir John observes, riding as well as every other exercise did hurt, increased the violence of the symptoms, and rendered the disease more speedily fatal. He has never seen any good effects from the use of the bark in scrophulous habits, where there were marks of inflammation, but generally it produced a confirmed phthisis, by increasing the fever, and bringing the tubercles to suppuration: and has been confirmed in this opinion, by the repeated observations also of the late Sir William Duncan."

Persons who are of a dropsical habit of body, may come directly from a hot country to England. A cool air will contribute much to their recovery.

The best method of treating such dropsical cases has been given by Dr. Monro and Baron Van Swieten*. I have only to add, that when the constitution was tole-

* See Monro's Essay on the Dropsy, and Van Swieten Comment. in Boerhaavii Aphorismos, tom. iv.

rably sound, I have often cured very obstinate dropsies, by exciting a gentle salivation with a scruple of pilulæ mercuriales, taken every other night, and by giving on the intermediate days, a mixture with squills and sal diureticus*.

By this method I cured above forty dropsical patients in the year 1765, who were seized with the disease after obstinate intermitting fevers; and have since found it frequently effectual in removing the dropsies which were the produce of hot climates.

SECT. III.

Directions for those who labour under an habitual Flux.

THE most frequent disease to which persons are subject, who have suffered

* ℞ Aq. pulegii simpl. unc. v. aq. raphani comp. unc. i. salis diuretici drach. i. oxymel. scillitici unc. ss. M. cap. unc. ss. 4tis horis.

much sickness abroad, is an habitual flux.

Rhubarb or ipecacuanha in small doses, frequently give relief in this complaint: when these have failed, and even though joined with opiates, seemed to ruffle the patient, I have observed good effects from ten grains of lapis calaminaris finely levigated, mixed with an equal quantity of philonium Londinense, given morning and evening. A decoction of the Simaruba bark*, when it does not offend the stomach, is also frequently of service.

Among an uncommon number of such patients, whom I have had opportunities of visiting, I always found, that if the flux was very obstinate, no relief could be obtained without the aid of opium. There was a necessity for adding it to all the

* ℞ Corticis simarubæ unciam unam, aquæ fontanæ sesquilibram; coque ad libram unam: tum colandus est liquor, quem totem partitis haustibus ægrotus ebibeat quotidie ante meridiem.

This medicine I first used on the recommendation of Dr Wind.

other medicines, whether purgative or astringent. Opiates, especially those of the warmer kind*, are as effectual in such cases, as the bark is in agues. If the patient seems more relaxed during the use of them, or more purged after the short respite obtained from them, these are proofs, not of any injury done by the medicine, but of the strength of the disease overpowering the efficacy of the remedy.

This disease, by its continuance, sinks the patient's strength, but frequently stops before death. I have seen an hundred cases where, after the whole fluids of the body had been, as it were, drained by a long continued flux, the discharge at length stopt, and the patient lived in good

* ℞ Philonii Londin. drach. ss. pulv. rhabarbari gr. x. syrupi papaveris albi q. s. fiat bolus mane et hora decubitus sumendus.

℞ Olei cinnamomi guttam unam, opii puri granum unum, confectionis cardiacæ, boli gallicæ sing. scrupulum unum, syrupi cujuslibet, q. s. fiant pilulæ.

spirits for some weeks, though reduced to a perfect skeleton. After death, the intestines were found perfectly free from ulcerations, and in a sound state.

END OF PART III.

APPENDIX.

ON THE INTERMITTING FEVER.

Its similarity in England to the Endemic of hot Climates. Its Prevention. Its Cure. Treatment in the cold Fit, hot Fit, Intermission. Of the Bark. Requisite Preparation of the Body. Period of the Disease. Manner of exhibiting it. Treatment of Children. Treatment of Symptoms. Remedies when the Bark cannot be used. External Applications. Remedies used by the Vulgar. Treatment under imperfect Intermissions. Recommendation of Opium in the hot Fit.

HAVING treated of the Diseases peculiar to different countries abroad, I cannot dismiss the subject, without offering a few thoughts on Agues, the endemial disease of marshy situations in England. The directions already given for the prevention of sickness in foreign climates, it will thence appear, are the most proper for preventing

the prevailing disease of low situations in our own climate; and the methods proposed for the cure of this our own endemic, will be found the most successful that can be used for the cure of the endemic diseas[e] of other countries.

An intermitting fever, or what is usually termed an ague, is a disease peculiarly frequent in low, woody, and marshy places; there persons of all ages, and of both sexes, are subject to its frequent attacks; even infants at the breast are not exempted from it. It is worst at particular seasons of the year, and in some years prevails more than in others. It is far from being mortal to the natives, but its long continuance is apt to impair their constitutions, and to produce obstinate chronical distempers. To strangers, and to persons accustomed to a pure air, it proves particularly severe, and sometimes fatal.

The means necessary to be employed in aguish situations and seasons, to guard against the attack of this disorder, first claims our attention.

Its prevention is a subject of greater dif-

ficulty than its cure. We are acquainted with remedies which seldom fail of removing the disease, but have not yet been able to discover means equally certain of preventing its return, or of guarding against its attacks in an impure air.

The immediate cause of agues in unhealthy situations, is the soil and air of the place; but the more remote causes, or those which render the constitution subject to the attack, are various. Under this head may be included, however, all those which produce a chillness of the body, and are generally said to be productive of colds, as lying in a damp room, or in linen not sufficiently dry, travelling exposed to a cold damp night, neglecting immediately to put on dry clothes after being wet by rain, and the like. The vulgar ascribe most fevers, agues, and other disorders, both in hot and cold climates, to such causes, or to irregularities in living: but they only dispose the constitution to receive the hurtful impressions of a bad air.

The first direction that we shall give for the prevention of agues is, that persons

subject to that disease should not reside in low marshy places during aguish seasons, but should then retire into large towns, where the bad effects of a damp air are in some measure corrected by the number of fires and the smoke. It has always been remarked, that agues are not only more frequent, but also more violent, in the country and farm-houses than in large villages or towns; and a retreat thither, or to a more dry and elevated situation, although at no great distance, often proves the most effectual preservative against them. In the autumn of the year 1759, two regiments which lay encamped on South-sea Common, near Portsmouth, were greatly distressed with intermitting fevers and fluxes; but upon leaving that spot of ground, and encamping about five miles distant from it, on Portsdown Hill, not one man was afterwards taken ill of those diseases.

Secondly, when necessity obliges people to remain in unhealthy situations, in order to avoid the influence of the damp air, they should sleep, during the aguish sea-

son, in the highest apartments of their house, and in those which look to the rising and meridian sun; they should shut up those doors and windows which front the low grounds or marsh; they should wear warm clothing, and should indulge in a plentiful diet of flesh, with wine and spices. Smoking of tobacco would also prove beneficial.

Thirdly, persons in aguish places and seasons, should carefully avoid all sudden transitions from extreme cold to great heat, or from great heat to an excess of cold; and they should particularly avoid exposing the body to an easterly wind, rain, or night fogs. They should never go abroad in the morning with an empty stomach; when fasting, they are most susceptible of the impressions of a damp, raw air; but, previous to labour or amusement in the fields, they should take either a glass of wine, with a slice of bread, or drink a small quantity of chamomile or bark tea. Labourers who are obliged to work in the open air before the sun has dispersed the unwholesome vapours arising

from low meadows or marshes, should be allowed by their masters an infusion of some garlic, bark, and rhubarb, in brandy, of which they should receive a dram, either by itself, or diluted with water, in the morning, before they go abroad, especially when employed in digging ditches, draining marshes, and the like dangerous occupations. They should also on such occasions chew garlic or rhubarb, put small plugs of tobacco in their nostrils, and not swallow their spittle.

Fourthly, strangers in aguish places, and persons subject to agues, should take, every other night, two or three tea-spoonfuls of tinctura sacra, or a few grains of pilula Rufi, so as to prove gently purgative. For farther prevention, they may take every morning before breakfast, a wine glass of an infusion of the bark and orange-peel in water*; or, what will

* Recipe Corticis Peruviani contusi unc. i. Corticis aurantiorum Hispaliensium semunciam, aquæ fontanæ bullientis sesquilibram: simul infundantur: subsidentia depuretur liquor, et tempore usus caute effundatur.

prove more effectual, a table-spoonful of a strong tincture of the bark in spirits*, diluted occasionally with water. Such as would prefer external, though less efficacious means of safety, may wear garlic or camphire, sewed up in a piece of linen, and suspended at the pit of the stomach or the groin: the known efficacy of remedies outwardly applied, and the extreme subtilty of the effluvia from those here mentioned, render such preservatives not altogether so contemptible as commonly imagined. The cold bath should be used as often as the weather will permit, which, by invigorating the body, enables it more strongly to resist the impression of a bad air.

In the cure of this disease, early recourse should be had to medical advice. The disease on its first attack, is with difficulty distinguished from other fevers, and it gains additional strength from its duration.

On the approach of the cold fit, as soon

---

* Recipe Cort. Peruviani triti unc. i. spiritus vinosi Gallici unc. viij. Digere per quatriduum et cola.

as a person is seized with a fit of shivering, or the chills of an ague, he should go to bed; and mixing two ounces of vinegar with a quarter of an ounce of finely powdered chalk, or of prepared crabs' eyes, should drink them immediately while in an effervescent or fermenting state. If this draught be nauseated by the patient, or if the cold fit should continue for some time after its use, a tea-spoonful of spirit of hartshorn should be taken in a draught of warm wine whey, or of balm tea, every half hour, until the patient falls into a sweat: the patient in the mean time, should be kept warm in bed. If the sweat does not appear soon, bottles of warm water, or bricks heated at the fire, should be applied to his feet. These generally shorten the cold fit, and produce a profuse sweat. The repetition of them also in the subsequent paroxysms prove equally serviceable, as I have experienced in several hundred cases. I have sometimes known agues easily removed by them after the most powerful remedies given in the other stages of the disease had failed. In the

first fit, the uncertainty of the future disease renders it necessary to proceed with caution; afterwards, when the true nature of the disease is discovered, the practice may become more bold.

During the hot fit, when mild, scarce any medicine is requisite upon the first attack of an ague; but when protracted to an unusual length, or accompanied with alarming symptoms, a blister should be applied to the back, and tartar emetic given in small doses, with an opiate after its operation*. In the future paroxysms, the hot fit may be shortened by the exhibition of an opiate, in a full dose, half an hour after its commencement, without any antimonial medicine; which method quickly abates the fever, and produces a sweat, as will more fully appear in the sequel. It is from the protracted state of the hot fit that the greatest danger is to be apprehended: in low fenny countries, agues frequently make their attack, during the autumn, under the form of a conti-

* See Part III. Chap. I. on continual Fevers.

nual or remitting fever, attended with violent symptoms, especially a delirium, from whence that state is commonly denominated the phrensy fever. This fever, unless brought to a speedy remission, is attended with considerable danger; and the most effectual remedies for procuring this, are blisters and antimonials. If large quantities of blood be repeatedly taken, by mistaking the disease for a true inflammatory fever, its obstinacy and fatality are greatly increased. Profuse bleedings are more particularly hurtful, when symptoms indicate a speedy remission of the fever, or its termination in a regular ague, which commonly is prevalent at the same time.

During the intermission of the fever, whether obtained from the medicines prescribed, or from the natural course of the disease, the bark should be given. In the proper administration of the bark, the cure of agues may be said entirely to consist; other remedies seldom become necessary, unless to prepare the body for this, to alleviate particular symptoms, or to re-

lieve in cases where the bark cannot be used.

The preparation of the body requisite previous to the administration of the bark, is not considerable. It is sufficient to cleanse the stomach and alimentary canal by an emetic or purge. When there is any sickness, I generally give six grains of ipecacuanha as an emetic; when there is no sickness, I prefer a stomachic purge, as an ounce or two of tinctura sacra, or a few grains of the pilula Rufi. These I give in the intermission, as soon as the patient is free from fever, so that their operation may be over before the return of the fit. As soon as the operation of the emetic or purgative is over, the bark may be given with perfect safety. The bark may be administered at any period of the disease. When the ague is slight, it need not be given till a second fit has evinced the true nature of the disease; but when the ague is severe, there is frequently an absolute necessity of administering it upon the first intermission, even with scarce any preparation of the body: instances have occurred, on unhealthy spots

in England, of agues having been so malignant, after hot summers, that a return of the fit sometimes proved fatal.

It is with many an opinion, that an ague must continue some time before it is completely formed, and that till such time it is highly dangerous to apply any remedy. This however daily experience contradicts: an ague cannot be stopt too soon; the more severe it is, the more urgent is the necessity of applying the remedy; as the constitution is always found to suffer least where the ague is early removed. Some confine this prejudice only to the exhibition of the bark, and refer to that medicine all the bad symptoms which are the natural consequences of the continuance or malignity of the disease. But most of the prejudices entertained against that medicine are founded on imperfect observation, and proceed from not distinguishing the effects of the remedy from those of the disease.

The advantage of administering the bark as early as possible in the disease, fully appeared in the year 1765, and the two

following years, during an uncommon prevalence of remitting and intermitting fevers, which spread themselves over the greatest part of England, and furnished me with a number of patients labouring under all the symptoms of these diseases.

When the ague was stopped by the bark, after the first or second fit, as in my own case, and those of two hundred of my patients, neither a jaundice nor a dropsy ensued. When the bark could not be administered, on account of the imperfect remissions of the fever, or when the patient had neglected to take it, either a dropsy or jaundice was the certain consequence; and the degree of violence with which it attacked, was in proportion to the number of the preceding fits, or to the continuance of the hot fit. By every paroxysm the dropsical swellings were visibly increased, and the colour of the skin rendered of a deeper yellow.

When the fever continued a few days without remission, the belly and legs generally swelled; a violent head-ache and vertigo also generally distressed the pa-

tient; so that some, even after the fever had left them, were not able to walk across their chamber for a fortnight or three weeks.

When the returns of the fever were perfectly regular, and even slight, four or five fits of a simple tertian were sometimes followed by the most dangerous symptoms; especially in the year 1765, when these fevers raged with the greatest violence; as in the following instance: A boy of fourteen years of age was attacked with an intermitting fever. I ordered him a dose of tinctura sacra, and afterwards the bark; but to my great surprize, notwithstanding several ounces of bark had been prescribed, his ague continued. After having suffered six fits of it, I found a considerable quantity of water in his breast, belly, and legs; and his countenance was so bloated and yellow, that the case seemed desperate. I was then informed, that having an insuperable aversion to medicines, he had not taken any of the bark, but was now willing to submit to every thing that would contribute to his recovery; and

immediately ordered him to take a drachm of the bark every two hours, and occasionally a mixture of syrupus scilliticus with sal diureticus. By these means another fit, which, in all probability, would have put an end to his life, was effectually prevented.

When a dropsical patient suffered a relapse into the ague, which frequently happened, there was an absolute necessity for putting an immediate stop to it by the bark; and in above seventy such patients, I never observed any other than the most beneficial effects to have resulted from it.

I never prescribed the bark until the patient was free from the fever; and then, without regard to a cough, or any other chronical indisposition, I ordered it to be given in large doses. I have given the bark in every circumstance attending intermitting fevers during their remission, but never gave it during the fit.

Having shewn the necessary preparation of the body previous to giving the bark, and having recommended the use of

that remedy early in the disease, we proceed to the manner of administering it. The bark frequently fails in removing intermitting fevers, from not persevering for a sufficient length of time in its use; from administering it in too small a dose; or from giving it in an improper form.

As to the first, it is a prevailing opinion, that an ounce, or an ounce and an half of the bark, taken during one intermission, should entirely prevent the return of another paroxysm. But this is a mistake; sometimes it may be sufficient; at other times another and severe fit will attack a patient who has taken that quantity; in this case, instead of doubting the efficacy of the medicine, the patient ought to persevere during the following intermissions, with an increase of the dose, until five or six ounces at least have been taken. The medicine should also not be omitted as soon as one fit is stopt, but should be continued in a smaller dose for at least ten days or a fortnight. And it would be advisable, even for several months after the disease is

removed, to take a little bark occasionally in damp weather, or during an easterly wind, to prevent a relapse.

The bark is often given in too small doses. Where the intervals between the fits are short, as in quotidians and double tertians, from one drachm to two drachms of it should be taken every two hours. Where the interval between the fits is longer, the doses may be smaller and more distant.

The form in which this medicine is administered is of some consequence. Mucilages and syrups have been recommended, to conceal the taste of it; but I find nothing more effectual for this than small beer or milk, especially the latter. A drachm of bark in two ounces of milk, drank quickly after it is mixed, may be easily taken by a person of the most delicate taste; and by washing their mouth afterwards with milk, there will not remain the least flavour of the bark: If the mixture be not drank immediately, the bark will impart to the milk a bitter taste. The bark is commonly given in electuaries or

boluses; but in these forms it proves much less efficacious than when given in juleps or draughts, with the plentiful addition of wine or spirits. I have observed that six drachms of powdered bark, given in a julep, consisting of one-fourth or one-third of brandy, is as effectual as an ounce given in the form of an electuary, and proves less disagreeable to the stomach. For patients unaccustomed to wine or spirits, each draught should be warmed with the spiritus salis ammoniaci, or with the tinctura myrrhæ*; both which improve the efficacy of the bark. Many have imagined, that the virtues of the bark are assisted by the radix serpentariæ and sal absinthii; some by the elixir vitrioli, or tinctura rosarum; and others by camphire, cinnabar, warm stomachics, and steel. But being thoroughly convinced that the virtues of the bark are greatly improved by wine or

* A drachm of the bark in powder may be given in two ounces of an aqueous vehicle. That quantity would require half a scruple by weight of the spiritus salis ammoniaci, or a drachm of the tinctura myrrhæ.

spirits, I now seldom prescribe with it any of the above-mentioned ingredients, which might render it more nauseous and disagreeable.

When the bark is entirely nauseated, from a weakness of the stomach, or from an aversion of the patient to the taste of the medicine, it will be proper to leave off the use of draughts, and to give the bark in clysters. In this form I have found it as effectual as when given by the mouth. A cathartic clyster should first be administered, after the operation of which, the bark clysters should be given, and repeated every three or four hours. They are best composed of a solution of the extract of bark, with the addition of a sufficient quantity of the tincturæ thebaica, in order to its being longer retained*; a small quantity of opium being commonly found effectual to prevent the bark, in any

* Rec. Extracti corticis Peruviani semunciam; solve coquendo in aquæ fontanæ unc. iv. et adde olei olivarum semunciam, tincturæ thebaicæ gutt. v ad x; fiat enema quarta quaque hora injiciendum.

form, from purging. An obstinate intermitting fever, which two ounces of the bark in draughts, taken in each interval of a fit, had failed to remove, was effectually cured by two ounces of the extract given in clyster. The extract has been administered in clysters to the quantity of six ounces, to patients who could not have received half an ounce of the bark in any other form; and many have been cured by clysters, after large quantities of the bark had been unsuccessfully taken by the mouth; it being in this manner that the largest quantities of bark can be administered.

It is frequently almost impossible to make children swallow any medicine which has a disagreeable taste or smell. Therefore, for children labouring under intermitting fevers, I order the spine of the back to be anointed, at the approach of the cold fit, with a liniment composed of equal parts of tinctura thebaica and linimentum saponaceum, which I have found has often prevented the fit. If this should not produce the desired effect, two

or three tea-spoonfuls of syrupus e meconio, given in the hot fit, will generally be found to mitigate the symptoms. But for the entire removal of the disease, after purging with magnesia alba, I prescribe the bark in clysters; giving a drachm of the extract of bark, with a few drops of the tinctura thebaica, in each clyster, to be repeated every three hours, for a child of a year old. The magnesia often occasions a vomiting, when the stomach is oppressed with phlegm; which evacuation should be promoted with warm water. The constant heaviness of the head, occasioned by these fevers, in such tender constitutions, is best relieved by the application of a blister to the back. The bark may also be applied externally to children: mixed with theriac and camphire, it may be applied in a poultice to the stomach or wrists; or sewn between the folds of a linen jacket, it may be worn next to the skin: and infants may sometimes be dipt in a decoction of it.

Of between four and five hundred patients, afflicted with remitting or inter-

mitting fevers, under my care in the year 1765, I lost only two; neither of whom had taken the bark.

M method of treating those patients will appear in the following cases:

1. A young gentleman was seized with a fit of an ague, and in half an hour became delirious, then comatose, at length speechless. Finding him in this state, I ordered a blister to be immediately applied to his back, and a cordial julep with salt of hartshorn to be poured by degrees into his mouth. In two hours afterwards, upon recovering his senses so as to swallow with ease, I ordered him two ounces of tinctura sacra, and then, as soon as the fever and sweat had abated, without waiting for the complete effect of the purge, half a drachm of the bark every four hours. He began the use of the bark three hours after he had taken the tinctura sacra; but before he had taken five drachms of it, he was seized with a second fit, and in like manner became delirious, comatose, and speechless. Sinapisms were applied to his feet, and other irritating applications used, until

the fever was terminated by a plentiful sweat. Thus having twice narrowly escaped dying in the fit, a drachm of the bark was ordered to be taken punctually every hour. He soon took two ounces of it: which had so happy an effect, that the fever left him entirely, and he had not any subsequent dropsy, jaundice, head-ache, or great weakness, which either the continuance of the fever, or its repeated attacks, often brought upon others; so that he was quickly restored to perfect health.

2. A lady, on the first attack of an intermitting fever, was seized with a violent pain in the stomach. Every subsequent fit increased that pain, insomuch that at length it became intolerable, was attended with a violent delirium, and brought on a great difficulty of breathing, a hiccup, a ghastly countenance, and the symptoms of approaching death. She found no benefit from emollient fomentations, from the external application of tinctura thebaica, or even from a blister. I ordered two ounces of the bark to be taken during one intermission of the fever. This effectually pre-

vented its return, and did not in the least increase the pain in the stomach: on the contrary, it greatly contributed to the relief of the pain, by removing the fever, every fit of which had so exasperated its violence.

Particular symptoms sometimes required a deviation from this general treatment. When the patient complained of a sickness at the stomach, retchings to vomit, or a spontaneous vomiting, a vomit was administered; and the bark was not given till this sickness was removed, or a purgative had cleared perfectly the whole alimentary canal.

Patients who laboured under a cough, and a pain in the side, affecting the breathing, were treated with warm fomentations, the balsamum anodynum Batæi, or a blister. When they were not relieved by these, I generally ordered a few ounces of blood to be taken away. But I principally endeavoured to stop the fever as soon as possible, by the administration of the bark; having found that every return of the fever increased such pains.

When the head-ache was very violent, and continued during the intervals of the fit, the success of the bark was rendered more complete by the application of a blister to the back.

A giddiness of the head, which is the symptom most commonly remaining after even a slight intermitting fever, was generally relieved by the sal cornu cervi*, and the bark in wine.

When, from the long continuance of the fever, the patient was distressed with flatulence, a distention of the abdomen, and a swelling of the legs, a spoonful of tinctura sacra, with the addition of thirty drops of the spiritus lavendulæ compositus, was ordered to be taken every night.

To prevent relapses of the ague, a continuance of the bark, a change of air, and the cold bath, were often found requisite.

Although in the year 1765, and the two following years, I annually prescribed upwards of an hundred and forty pounds weight of bark, I never observed any bad

---

* ℞ Aquæ alexiteriæ simplicis ℥ vii, salis cornu cervi ʒ ss, syrupi e corticibus aurantiorum ℥ i, m. fiat julepum, capiat cochlearia duo subinde.

symptoms which could with propriety be ascribed to its use, except in two instances. One, in the case of a young woman, whose menses were supposed to have been obstructed by it for three months: the other, in that of a person subject to an habitual asthma, who, after taking a drachm of this medicine, was seized with a suffocating fit of the asthma, which continued until he vomited up the bark, when he received immediate ease. I have observed that patients are equally subject to relapses, whether cured by the bark, or by other medicines; indeed I seldom prescribed other medicines, until the bark had been first taken. In the winter of the year 1765, the quartan agues attacked those only whose constitutions had been weakened by the long duration of their former agues.

It is sometimes necessary to have recourse to other remedies besides the bark, for the cure of intermitting fevers. Many patients have an insuperable aversion to that medicine; by a long continued use it is apt to produce a nausea, and sometimes to lose much of its efficacy; and there are instances of obstinate intermitting fevers,

which it has failed to remove. In such cases I have prescribed various other medicines; but find, that although an intermitting fever may be cured without the bark, there is not any other remedy which proves so generally successful as it.

Next to the bark, I have prescribed no medicine with greater success than alum joined with nutmeg.

A blister to the back, and a decoction of bitters, with sal absinthii and sal ammoniacum, have sometimes succeeded with me in inveterate agues.

From ten to twenty grains of extractum gentianæ, taken twice a day, with two ounces of tinctura sacra three hours before the fit, have also removed very obstinate intermitting fevers.

Five grains of the extractum cicutæ, taken morning and evening, sometimes relieved.

What has proved more effectual is, small beer in which glass made red hot has been quenched, used for common drink during the course of the bark, in such a quantity

as neither to prove violently emetic or purgative: it is sometimes apt to purge, but when its operation this way is too violent, the purging is soon checked by an opiate.

Among many other remedies, I have given the cortex cascarillæ, to the quantity of half a drachm every four hours; but found its effects inconsiderable.

I have also tried a grain of the vitriolum cæruleum, taken twice a day; a medicine used in some hospitals: but as it occasioned a constant sickness and vomiting, even when joined with an opiate, few patients could be prevailed upon to persist in the use of it.

The Faba Sancti Ignatii, recommended in the Madrid Pharmacopœia as a remedy for intermitting fevers, under the title of Faba Febrifuga, and of which an account is given in the Philosophical Transactions*, I gave to several patients. Two grains of it, infused in two ounces of boiling water,

* Vid. The Philosophical Transactions, No. 249, 250, and 257.

made a nauseous bitter; repeated twice a day, it cured four patients of quartan agues, but failed in double that number.

Various other medicines were prescribed, and often with success. The forms of these are given in the subjoined note*.

---

* Rec. Aluminis rupei gr. xv. nucis moschatæ, extracti corticis Peruviani, singulorum gr. x. syrupi e corticibus aurantiorum q. s. misce, fiat bolus bis die sumendus.

Rec. Florum martialium, salis ammoniaci, singulorum gr. viij. myrrhæ gr. iv. rubiginis ferri gr. iij. extracti gentianæ gr. vi. syrupi e cort. aurant. q. s. misceantur, fiat bolus bis die sumendus.

Rec. Pulveris corticum aurantiorum semidrachmam ter die.

Rec. Pulveris florum chamœmeli semidrachmam, bis die.

Rec. Salis absinthii drach. i. elixir aloes scrup. ii. vini albi unc. iij. misceantur, fiat haustus.

Rec. Florum chamœmeli unc. ii. seminum santonici drach. vi. syrupi simplicis q. s. misce, fiat electarium; capiat molem nucis moschatæ quoque bihorio.

Rec. Salis absinthii semidrach. spiritus vitrioli tenuis gutt. xxx. aquæ alexiteriæ simpl. unc. iv. misce, fiat haustus, ingruente paroxysmo sumendus.

Rec. Florum chamœmeli, radicis serpentariæ

Dr. Morton's powder for agues* has been much celebrated. Dr. Boerhaave has recommended twenty grains of sal ammoniacum to be taken two hours before the fit. This salt is perhaps best given in powder, wrapped up in wafer paper, that it may reach the stomach almost undissolved; and may be taken from a scruple to a

---

Virginianæ, singulorum semunciam, limaturæ ferri drach. ij. syrupi e cort. aurant. q. s. fiat electarium, cujus capiat æger molem nucis moschatæ quater in die.

Rec. Salis ammoniaci crudi drach. ij. salis polychresti, spiritus volatilis aromatici, singulorum drach. i. aquæ menthæ vulgaris simplicis unc. viij. sacchari albi unc. i. misce, capiat cochleare unum singulis horis tempore paroxysmi.

Rec. Salis ammoniaci crudi, theriacæ Venetæ, singulorum scrup. ij. misce, capiat hora una ante adventum paroxysmi.

Rec. Salis absinthii drach. ij. vini albi lib. i. misceantur, capiat partitis vicibus tempore apyrexiæ.

See other remedies in the Formula Medicamentorum, in my Essay on preserving Seamen.

* ℞ Pulveris florum chamœmeli scrup. i. antimonii diaphoretici, salis absinthii, singulorum semiscrupulum. Misceantur; fiat pulvis. quarta quaque hora, durante apyrexia, sumendus.

drachm. Some add theriaca to the salt; which last medicine has been often taken by itself, upon the authority of Galen; and of late, both the sal ammoniacum and theriaca are often joined with the bark. Dr. Hoffman recommends mercurius dulcis, and even a salivation, for the cure of obstinate quartans. Dr. Huxham makes mention of mercurius alkalizatus, for the cure of intermitting fevers. Dr. Mead recommends, in case of a failure of the bark, a powder composed of chamomile flowers, myrrh, and salt of wormwood, with the addition of a little alum. A decoction of the flores chamœmeli has been much used, by way of a vomit, in this disease; and two ounces of this decoction, or of the infusum amarum, with half a scruple of sal absinthii, taken every four hours, have been frequently prescribed.

In the East Indies the Tellicherry bark, or what is there called the Cort. de Pala, has been found very beneficial in removing obstinate intermitting fevers. The bark also of the mahogoni tree, which resembles much the Peruvian bark, and is often frau-

dulently mixed with it, is said lately to have been found serviceable in Jamaica, for the cure of intermitting fevers.

Before the discovery of the bark, the cure of agues was generally attempted by bitters, such as chamœmelum, centaurium minus, gentiána, cortex aurantiorum, zedoaria. These bitters, together with fixed alkaline salts, are still in great esteem with some physicians, who entertain prejudices against the bark; all which, it is to be hoped, will soon be removed.

Opinionum commenta delet dies.

External applications have considerable efficacy in this disease. Compositions of frankincense, cinnabar, camphire, woodsoot, turpentine, and the like, applied to the wrists, or sometimes to the pit of the stomach, have been recommended by several very eminent authors; particularly Fuller's frankincense plaister*. I knew a gentleman labouring under a very obsti-

---

* ℞ Thuris drachm, ij. Tacamahacæ drachm, i. Croci semiscrupulum, Terebinthinæ Venetæ q. s. Misceantur, ut fiat emplastrum carpis applicandum.

nate intermitting fever, who by applying to the wrists whites of eggs beat up with salt, at the approach of the fit, often prevented it; especially when a vesication ensued. Bruised garlic will often produce the same effect, but is apt to occasion fainting fits, in delicate constitutions, being too acrid and irritating. I have found that anointing the spine of the back with the oleum succini, will prevent the fit of an ague as often as most external applications.

A change of air is frequently the most effectual means of obtaining a cure: the most obstinate intermittent I ever had occasion to see, was removed by a change from the land to the sea air; the patient never had one fit after being sent on board a ship.

There is perhaps no other disease for which so many remedies are daily recommended, as for an intermitting fever. Those used by the vulgar are many: the principal of them we shall here enumerate.

In the cold fit, or just before its approach, are taken—Brandy, from a glass

to half a pint, by itself; or with a grated nutmeg, with half an ounce of brimstone, or with half an ounce of powdered oyster-shells.—A quarter of a pint of gin with a tea-spoonful of pepper.—A glass of usquebaugh with a spoonful of lemon-juice.—A pint of wine taken by itself; or a glass of it with the white of an egg, with a spoonful of the juice of house-leek, or with the same quantity of the juice of plantain.—A spoonful of the spirit of turpentine.—Four spoonfuls of the juice of rue.—Half a pint of the juice of nettles.—Half a pint of the juice of groundsel.—Half a pint of a strong decoction of cinquefoil. Half a pint of a strong decoction of spear-mint in milk.—A pint of a strong infusion of horse raddish in stale beer.—A pint of strong beer, in which some broken pieces of glass bottles, or of flint stones heated in the fire, have been quenched, and boiled.—A whole lemon.—A vomit of sea water.—The snuff of a candle with nutmeg.—A drachm of bark and theriac, with the juice of a large lemon.

In the intervals of the fit, are taken,—

Bay leaves dried and powdered, to the quantity of a drachm, three times a day.—The inner bark of the ash, from half a drachm to a drachm, with a scruple of salt of wormwood, four times a day.—Half a drachm of the misletoe of the oak, three times a day.—The inner bark of the elm near the root, to the quantity of a drachm, three times a day.—Half a drachm of the root of black thorn, taken three times a day.—A drachm of Calamus Aromaticus, taken nine mornings successively.—Half an ounce of brimstone in a glass of strong beer, taken three mornings successively.—Half an ounce of mustard seed in half a pint of gin, three mornings successively.—A common spider gently bruised, and wrapped up in a raisin, taken either in the cold fit, or three successive mornings during the intermissions.—Five grains of cobwebs mixed with crumbs of bread, twice a day.

Among the external applications used by the vulgar for this disease, are—A hard-boiled egg split, and applied hot to the wrists.—Camphire and saffron hung in a

bag at the pit of the stomach.—Rubbing the back-bone with garlic.—Bruised spiders and tobacco applied to the wrists.—Petroleum applied either to the feet or wrists.—Yarrow to the feet.—Rue, with the buds of honey-suckle, bramble, and elder, to the wrists or feet.—To the wrists or feet they also apply mouse-ear with vinegar and salt, wall-pepper, shepherd's-purse, sun-dew, vervain, and other plants. These are generally applied about an hour before the fit.

By the spirits or wine drank at the approach of the fit, the patients generally become intoxicated, and they for the most part increase the quantity, until that effect is produced, which occasions a very severe head-ache, and aggravates the hot fit, but sometimes puts a stop to the future returns of the disease; a cure attended with great pain and danger. It is doubtful how far the other ingredients, mixed with the spirits or wine, may contribute to remove the disease, except such as occasion a violent vomiting; an emetic taken an hour before the fit frequently proving serviceable.

Many of the other remedies taken before the fit, operate by producing a sweat. From the violent operation of the ignited glass or flint quenched in beer, and frequently of the crude brimstone, some arsenical particles may be suspected to be conveyed by them; and in that case there will be no difficulty to account for their efficacy in curing inveterate agues.

The basis of the quack medicines used for this disease is generally the bark, infused in wine or spirits, with an addition of snake-root and salt of wormwood. But persons cannot be too cautious in using quack medicines for agues, as the poison of arsenic, in a small quantity, is known to be very powerful in removing them; a remedy which, incautiously used, would prove worse than the disease, and often be productive of the most alarming symptoms!

After all, it is certain, that the bark, when good in its kind, and judiciously given, is the most effectual remedy that can be administered, and has often completed a cure when every other remedy had proved unsuccessful. There are, however,

many cases of intermitting fevers, in which this remedy cannot with safety be given in any form. The attack of the fever is often so violent, that it leaves the constitution generally disordered; the patient is seldom or never free from the fever, and is constantly harassed with a severe headache, pain of the back, and uneasy sensations of heat, pain, and oppression over the whole body. In short, there is often no complete intermission of the fever, in which the bark can be given; although the preservation of the patient's constitution, and sometimes that of his life, seems to depend on its administration. In this situation, when giving the treatment of the hot fit, the free use of blisters, antimony and opium, was formerly recommended: on the use of the last, it was reserved to this place more fully to enlarge.

It has long been a prevailing opinion, that the cold fit is attended with the greatest danger; and that most who die of intermitting fevers, expire during the rigors. I never saw a person die in the cold fit, but have known several carried off

in the hot one, by strong convulsions, a delirium, and other symptoms; and am clearly of opinion, that it is the hot fit, or fever, which most endangers the patient's life, and by its continuance, weakens and impairs his whole habit of body.

For this fever, I have in opium been so fortunate as to discover a remedy, which generally in a few hours brings on a complete intermission. This discovery was owing to the following incident.

In the month of December, 1766, a lady, after some days indisposition, was seized with a violent fit of an ague, which left her very weak and universally disordered. In thirty-six hours afterwards the fit returned. It had continued twelve hours, when I was called to visit her. At this time her strength and spirits were so exhausted, that she began to despair of recovery. She complained of severe pains over the whole body, but principally in the head and back; the head-ache was indeed so intolerable as to threaten a delirium; a constant retching and vomiting at the same time, reduced her to a state of great

great languor, accompanied with a strong tendency to convulsions. In this condition I immediately prescribed an opiate, and in less than five minutes it restored her to a state of perfect ease and tranquillity. In less than half an hour she sat up in her bed, and could take nourishment. All that night she slept little, though she had no other complaint but weakness and fatigue. Next day she took the bark, which effectually prevented the return of the fever; and she quickly recovered her former strength.

About a month afterwards she had a relapse. The intermissions of the fever were short and indistinct. When I was called she had laboured under it forty-eight hours, and most of the former violent symptoms had appeared. As she was very hot, had a strong fever, and had no vomiting, I was at first unwilling to give an opiate, but, unable to resist her solicitations, I at length consented to it. The opiate was no sooner given, than it again brought on a perfect intermission, and gave immediate relief from all her distressing symptoms. Next day

she had recourse to the bark, which stopt the ague; and she has continued ever since in perfect health; using, for some time afterwards, the precaution of taking the bark once or twice a day during moist weather, or an easterly wind, particularly at th full moon.

Such benefit being unexpectedly received from an opiate, I determined to make a further trial of its effects. Having at that time twenty-five patients labouring under intermitting fevers, I prescribed an opiate for each of them, to be taken immediately after the hot fit, provided the patient had then any inquietude, head-ache, or similar symptom usually subsequent to the fever. The consequence was, that nineteen in twenty-two received immediate relief; the other three had no occasion to take it.

Encouraged by this success, I next day ordered the opiate to be given during the hot fit. In eleven patients out of twelve, to whom it was thus administered, it removed the head-ache, abated the fever, and produced a profuse sweat; which was soon followed by a perfect intermission.

Since that time I have prescribed an opiate* to upwards of three hundred patients labouring under this disease. I observed, that when given during the intermission, it had not any effect, either in preventing or mitigating the succeeding fit; when given in the cold fit, it once or twice seemed to remove it; when given half an hour after the commencement of the hot fit, it generally gave immediate relief.

The effects of opium given in the hot fit of an intermitting fever, are—1st, It shortens and abates the fit; and this with more certainty than an ounce of bark is found to remove the disease. 2dly, It generally gives a sensible relief to the head; takes off the burning heat of the fever, and occasions a profuse sweat: this sweat is attended with an agreeable softness of the skin, instead of the disagreeable burning sensation, which usually affects patients sweating in the hot fit, and is more copious than

* The following was the draught prescribed:

Recipe, Aquæ fontanæ sescunciam, aquæ alexiteriæ spirituosæ, syrupi meconio, sing. drachm. ij. tincturæ thebaicæ gutt. xv. ad xx. M.

in those who are not under the influence of opium. 3dly, It often produces a soft and refreshing sleep to patients before harassed with the fever, from which they awake bathed in sweat, and in a great measure free from complaint.

I have always observed, that the effects of opium are more uniform and constant in intermitting fevers than in most other diseases, and are then more quick and sensible than those of most other medicines. An opiate thus given, soon after the commencement of the hot fit, by abating the violence and lessening the duration of the fever, preserves the constitution in a great measure uninjured. Since I have used opium in agues, a dropsy or jaundice has seldom attacked any of my patients, in these diseases.

In cases where opium did not immediately abate the symptoms of the fever, it never augmented their violence. On the contrary, most patients reaped some benefit from an opiate given in the hot fit; and many of them bore a larger dose of opium at that time than at any other.

Even a delirium in the hot fit is not increased by opium; though opium will not remove it. If the patient be delirious in the fit, the administration of the opiate ought to be delayed until he recovers his senses; an opiate will then be found to relieve the weakness and faintness which commonly succeed the delirium.

Opium seems also, in this disease, to be a good preparative for the bark, as it not only produces a complete intermission, in which case alone that remedy can with safety be administered; but occasions so salutary and profuse an evacuation by sweat, as frequently to render a less quantity of the bark requisite.

The opiate was generally given in about two ounces of tinctura sacra, when the patient was costive, and was to take the bark immediately after the fit: thus at the same time shortening the fit, and cleansing the intestines, previous to the administration of the bark. The operation of the tinctura sacra is not prevented, though somewhat retarded by the opiate. When a vomit is given just before the fit, the ad-

ministration of the opiate after it, should be postponed until the hot fit is begun.

These observations are the result of an extensive practice: during the late epidemical rage of intermitting fevers in the years 1765, 6, and 7, I seldom visited less than thirty or forty patients every day, labouring under every species of this disease. I have confined myself chiefly to practical observations: the different species of intermitting fevers have already been amply described, both by the ancient and modern physicians; those diseases having been as obstinate in Greece and Rome, in the days of Hippocrates and Galen, as they are at this present time*.

Although nothing has been added to

---

* Les fievres intermittentes, qu'on appelle vulgairement fievres d'accès, exercent leur empire dans presque tous lès golfes du Levant; tellement que j'ai vu dans ceux du Volo, de Zeitoun, de Lepante, de Corinthe, d'Alexandrette, et plusieurs autres, des vaisseaux presque désarmés par les ravages qu'elles avoient faites sur les équipages.

Essai sur les Maladies des Gens de Mer, par G. M. Maître des Arts et en Chirurgie, publié à Marseille, an. 1766.

the accurate description of these fevers given by those old authors, yet the industry of later ages, by the discovery of new medicines, and by the more extensive application of those before known, has rendered these diseases no longer the opprobrium of physic.

AN EASY WAY TO RENDER SEA WATER FRESH, AND TO PREVENT A SCARCITY OF PROVISIONS AT SEA.

Sea Water freshened by Distillation. General History of the Discovery. Objections obviated. Contrivances for distilling it. Large Quantity yielded by a Ship's Coppers; the requisite Time and Fuel. Examples of Distillation at Sea, with a Still, inverted Tea-kettle, Hand-pump. When fresh Water scarce, Provisions to be dressed in the Steam of Sea Water. Inquiry into Substances of most Nutriment. Salep and Portable Soup contain most under the smallest Bulk; are cheap; easily prepared as Food, without Fire, with Sea Water; keep long. Recommended at Sea. Short Allowance. Money to be paid in the Merchant Service as in the Navy.

IT may not be foreign to the subject of this Treatise, to subjoin a few directions for defending those who go abroad, against the calamities of hunger and thirst.

The means of obtaining fresh water at sea, has hitherto been justly esteemed a re-

quisite towards perfecting the art of navigation. The want of this necessary article in the midst of a wide ocean, whose extent leaves no prospect of relief, has always been considered one of the most dismal situations in which seamen can be placed. Such we mean to refer to the surrounding element for relief.

In the year 1761, I was so fortunate as to discover, that the steam arising from boiling sea water was perfectly fresh, and that sea water, simply distilled, without the addition of any ingredient, afforded a water as pure and wholesome as that obtained from the best springs. I found, after a series of experiments, that the steam arising from sea water, while boiling, did not contain any perceptible salt or bitumen; that it was sufficient to cool this steam in order to have good water; and that the slight burnt taste which it acquired from the vessels, quickly went off on exposing it to the air. In short, I found that ships at sea, when in want of fresh water, might always be effectually relieved, by boiling sea water, and collecting

the steam arising from it. I recommended their carrying always a still to sea for this purpose; but when they were not provided with a still, found it might be done in smaller quantity, by boiling the sea water in the same vessels they usually did their provisions, fixing a metal pipe into the cover of the vessel to receive the steam, and afterwards making the pipe pass through a cask of cold sea water, to condense or again cool the steam into fresh water. This simple form of distillation would generally yield a sufficient supply of water to preserve the lives of all the men on board. Should a larger quantity be requisite for matters of convenience, it would require fitting a still-head to the vessel, and using a proper worm-tub or cooler.

The distillation may be carried on, when fuel is plenty, by having nothing but the sea water put into the pot; but when fuel is scarce, to save that article as much as possible, it may be carried on by applying the still-head to the pot in which the provisions are boiling: the distilled water

will be equally good, whether the water in which the provisions are boiled be fresh or salt, only it will have received a slight flavour from the particular article boiled. This, however, will not be necessary in ships of war, as, from the construction of the coppers, there are always two heated at the same time, so that the distilling vessels may be applied to one copper, while the provisions are boiling in the other. In either case, the distillation is attended with very little trouble, and may be so conducted as to prove no interruption to the cooking of the victuals. Having given in the latter editions of my Essay on preserving Seamen, a full account of this discovery, and of the benefits resulting from it, I will here only add such circumstances as were there passed unnoticed.

The importance of this discovery no sooner engaged the attention of the public, than it shared the fate of many other useful discoveries: it was claimed from the author by other persons; was said to have been formerly known; and met with va-

rious objections. Each of these we will separately examine.

A claim to this discovery by Doctor Poissonniere, appeared in a paragraph of news from Paris, dated July the 9th, 1764*.

But three years before, in 1761, I had publicly demonstrated, by various experiments, at the Royal Academy at Portsmouth, that a simple distillation rendered sea water perfectly fresh, pure, and wholesome. These experiments were made in the presence of Mr. Hughes, resident Commissioner of the Navy at that port, and of Mr. Robertson, late Master of that Academy. In the month of May, 1762, an account of this discovery was read at a numerous meeting of the Royal Society in London; and in March 1763, the second edition of my Essay on preserving Seamen, containing this discovery, was published in London, by the authority of the Lords

* Doctor Poissonnierre, I since find, has in his Memoir, confined his claim only to an improvement in the construction of a still for the use of ships at sea.

Commissioners of the Admiralty; which honour their Lordships were pleased to confer, on account of this important discovery.

Ten years after this discovery was made, in the year 1771, Mr. Irving made an alteration in the method of distilling the sea water, by substituting, in order to condense the steam, a large open pipe kept constantly wet with mops, to the small slender pipe passed through a tub of cold water commonly used in distilling. This, from being applied to larger coppers than the common method ever had been in the distillation of sea water, yielded a larger quantity of fresh water than the former had done. For this supposed improvement, he received a reward from parliament, which has led some to believe him to have been the original discoverer of sea water being rendered fresh merely by distillation. This opinion we need not here stop to refute, as, besides the experiments and publication already mentioned, the first edition of this Appendix was presented to the public several years before Mr. Irving began his experiments. The

supposed merits of his alteration in the method of distilling the water, I have already sufficiently discussed in the last * edition of my Essay on preserving Seamen.

Secondly, It is said, this simple method of rendering sea water fresh, was before mentioned by Lord Verulam, and practised by Sir Richard Hawkins.

The passage * of Lord Verulam referred to, is as follows: "It hath been ob-
" served by the ancients, that salt-water
" boiled, or boiled and cooled again, is
" more potable than of itself raw; and
" yet the taste of salt in distillations by
" fire riseth not; for the distilled water
" will be fresh. The cause may be, that
" the salt part of the water doth partly
" rise into a scum on the top, and partly
" goeth into a sediment in the bottom,
" and so is rather a separation than eva-
" poration; but it is too gross to rise into
" a vapour, and so is a bitter taste like-
" wise; for simple distilled waters of

* The third edition, Chap. I. Sect. XIV.

† Bacon's Natural History, Cent. 9th, Exp. 881.

" wormwood, and the like, are not bit-
" ter." This great philosopher knew, that neither a bitter taste nor that of sea salt, rose in distillation with water; it being a common custom to preserve herbs for distillation with sea salt, which notwithstanding being put in the still with the salt, yet yield a water perfectly fresh. However, it was not the salt itself, nor the bitter taste, which was supposed to rise in the distillation of sea water, but a bituminous substance, and a spirit of sea salt; which has hitherto been the unanimous and uncontroverted opinion of the chemists.

Sir Richard Hawkins is said to have known that sea water was rendered fresh simply by being distilled, from an ambiguous expression in his voyage, that he " with four billets distilled a hogshead of " water wholesome and nourishing." No mention is indeed made whether with, or without, the assistance of additional ingredients; but till I had published that no ingredient was necessary to render sea water fresh, Sir Richard was always sup-

posed to have some ingredient*. His expression even pointed out the ingredient used, *viz.* wood ashes: four billets of wood were too small a quantity to have been employed as fuel: agreeable to the prevailing idea, that it was necessary to add something to the water to keep down the bitumen, they must have been burnt to ashes, and then mixed with the sea water from which the hogshead of fresh water was distilled; so small a quantity of fuel would scarce warm a hogshead of water, far less raise it into vapour.

That it was not understood, either from Lord Verulam or Sir Richard Hawkins, that the waters of the sea could be rendered fresh merely by distillation, without adding some ingredient to keep down the

* See a letter from Captain Chapman to Doctor Fothergill, published in the London Magazine for August 1759, where the Captain gives an account of his distilling fresh water from the sea, first with the assistance of soap, then (led by this expression of Sir R. Hawkins) of wood ashes; and displays much ingenuity in contriving a still from the materials on board of ship, having on his return from Russia lost most of his water in a hard gale of wind.

supposed bitumen and spirit of salt, fully appears from the approbation since given to the following attempts.

A few years after his Lordship's death, Sir Theophilus Oglethorpe and some gentlemen, obtained a patent for distilling from the sea, a water fresh and potable by means of several additional ingredients, and made several experiments upon it on board ships at Spithead.

In the year 1739, the learned Doctor Hales proposed a method of distilling fresh and wholesome water from sea water, by making it undergo a previous putrefaction.

In the year 1753, Mr. Appleby was thought to have brought this matter to the greatest perfection, by discovering an effectual method of fixing the supposed bitumen and spirit of salt by means of Lapis Infernalis, and calcined bones. This was published in the London Gazette of January 22d, 1754, as follows: "Mr. "Joshua Appleby, of Durham, chemist, "having discovered an easy and expeditious method of rendering sea water "fresh and wholesome at sea; and the

"same, on a reference from the Admi-
"ralty, having been thoroughly examined
"and approved by the College of Physi-
"cians and the Commissioners of the Vic-
"tualling, the Lords Commissioners for
"executing the office of Lord High Admi-
"ral of Great Britain and Ireland, have
"published the process used by the said
"Joshua Appleby, in the London Ga-
"zette, that so useful a discovery may be
"universally known. It is as follows:
"Put twenty gallons of sea water into a
"still, together with six ounces of lapis
"infernalis, and six ounces of bones cal-
"cined to whiteness, and finely powdered.
"From this quantity fifteen gallons of fresh
"and wholesome water may be extracted,
"in two hours and a half, at the expence
"of little more than a peck of coals.—
"This proportion of ingredients will an-
"swer very well in these northern seas;
"but in some parts of the Mediterranean
"or Indian seas, where the water is more
"salt and bituminous, the quantity must
"be increased to nine ounces of each.—
"The ship's boiler should not be used for

"this process, what remains being very "noxious."

The attention of all Europe was at that time drawn towards this discovery, which was esteemed the most fortunate of the age: various substitutes were proposed, instead of the noxious ingredients used in Mr. Appleby's process. For this purpose, Doctor Butler recommended capital soap-leys, Doctor Alston lime-stone, and Doctor Hales powdered chalk.

I fortunately discovered, that all those ingredients were unnecessary, and that a simple distillation rendered sea water perfectly fresh and wholesome, while engaged in making comparative trials of the different ingredients, which had been proposed for keeping down the supposed bitumen and spirit of sea salt, in order to ascertain the best. Finding my first experiments unsatisfactory, I intended to pursue them farther; and began by distilling both rain water and sea water alone, to be kept as standards, whereby to judge of the effects of the different ingredients upon them. I was then pleased to find that

both these distilled waters, which I had been led to consider as extremes, were, as far as I could judge, in every respect alike and equal in purity to each other. Further experiments fully confirmed this. The burnt or empyreumatic taste of the distilled sea water, which had been formerly ascribed to bituminous substance, and had given rise to different ingredients being added in the still, I found was contained in the same degree by the distilled rain water. I found that it depended merely on the action of the fire, and that it quickly went off on exposing the water to the open air. Having thus discovered, that the intervention of any ingredient was unnecessary for freshening sea water, I immediately turned my attention to the most easy method of distilling it, and recommended, as the most simple means for that purpose, that all ships should carry to sea still-heads fitted to their coppers or boilers. This I shewed, would yield a supply of fresh water as often as the common fire was burning, even though the provisions were boil-

ing at the same time, and in cases of scarcity, would always prove an effectual relief.

Lastly, this discovery met with various objections, the principal of which I shall here endeavour to obviate.

Objection 1.—A still is requisite for the distillation; which would be inconvenient in a ship.

Answer.—A principal advantage of this discovery, consists in there being no longer a necessity for carrying a still to sea, as the ship's coppers or pots for boiling the victuals, fitted with still-head covers, will fully answer that purpose, and are generally fixed in as commodious a manner as any stills can be. They only require a worm-tub or cooler, to be occasionally placed near them during the distillation, which at other times may be kept in the hold: this is a cask of cold water, through which a metal pipe, conveying the steam, is made to take several turns, in order to condense the steam into water. By recommending still-head covers to the coppers, I do not mean that they should observe the exact form of the common stills;

such precision might somewhat increase the quantity of water distilled; but in general it will be sufficient to have a large pipe, or a head in the shape of a funnel, rising from the top of the copper, which should be of such a height, as to prevent the sea water in the copper from washing over it, by the motion of the ship. This large pipe or head receives the steam, and, by means of a small pipe inserted, conveys it to the cooler. The distilling of sea water will not injure the coppers, as appears from their being daily cleaned by boiling of sea water in them; whereas when chalk, lime, and that poisonous ingredient lapis infernalis were used, a still must have been necessary; as it would require great trouble to clean the coppers afterwards, so as to render them again fit for boiling the victuals. No better proof can be obtained of the coppers being constantly kept clean, and free from verdigrise, than the distilled water being always perfectly sweet and good.

Objection 2.—A sufficient quantity of

fuel for the distillation cannot conveniently be carried to sea.

Answer.—I have already shewn here, and more fully in the Essay on preserving Seamen, that fresh water may in pretty considerable quantity be procured at sea without any additional expence of fuel, by fitting still-heads to the ship's coppers, which would then yield fresh water as often as the provisions are boiling; or, if a larger quantity be requisite, by fixing iron pots, instead of bricks, at the sides of the fireplace, which being filled with sea water, might be made constantly to continue the distillation, howsoever the fire was engaged. But it is not on this point I mean to insist: to supply all persons at sea with a quantity of water sufficient for every common use, was not the object of my attention: it was confined to relieve them under circumstances of particular distress, and effectually prevent, in future, persons dying of thirst at sea. The vessel used for boiling the victuals of the whole ship's company, fitted with a proper still-head,

will serve to distil a quantity of water sufficient fully to answer this purpose. They who imagine that a distress for want of water in a ship, will also be attended with a want of fuel, must be ignorant of the contents of a ship, which are almost wholly combustible. The stowage of the hold is with fire-wood. The carpenter's stores, the junk, or pieces of old cable, &c. would, at the end of the longest voyage, serve for several months as sufficient fuel for distilling the quantity of water necessary to preserve the lives of the whole ship's company. And we will presently shew, that by laying in a very small addition of fuel, to what is done for the common purposes of the ship, a quantity of fresh water may be obtained from the sea by distillation, which, even in the most crowded ships, would equal the usual allowance carried to sea for each man.

Objection 3.—Danger attends he distillation of water on board a ship.

Answer.—No more danger attends the distillation of sea water, than the boiling of it in a common pot or copper. The only

inconvenience to which it is liable, is that of being apt to run over from too intense a heat, or from the motion of the ship; by which last it is much less affected in distillation, than when boiling in an uncovered copper.

I shall next endeavour to point out a few simple contrivances for distilling of sea water, for the benefit of those who may be in want of fresh water at sea, and may not have used the precaution of carrying out a still-head.

When sea water is boiled in a close covered pot or vessel, it may be observed, that the steam arising from it is converted into fresh water, on the inside of the cover of the pot. From a pot of thirteen inches diameter, by frequently removing the cover, and pouring off the water collected upon it, a quarter of a pint of fresh water may be procured in an hour. The cover of the pot should be, at least, five or six inches above the surface of the sea water, to prevent its boiling up to it.

Let us suppose a ship at sea to be in distress for want of water, having eight

men on board, and that the pot for boiling their provisions can contain five gallons and a half, being twelve inches in diameter; by the following simple contrivance, with only a tea-kettle, a musket, and a cask, one gallon of fresh water may be procured every three hours; which is a pint for each man.

File off the handle of the tea-kettle, and fix the head of the kettle when inverted, into a hole made for that purpose in the cover of the pot: this will prove a complete still-head. Take the barrel of the musket out of the stock, and after unscrewing the breeching pin, put the barrel through two holes bored for its reception in the cask, with a proper descent for the distilled water to run off; then stop up the holes in the cask, and fill the cask with sea water; which will be a refrigeratory or cooler to condense the steam. In order to carry on the distillation, these should be joined, by inserting the spout of the tea-kettle into the upper end of the musket-barrel: all the joints and places from whence the steam could escape, should be

luted or stopped up: a paste, composed of equal parts of chalk and meal, moistened with salt water, will do this effectually, and may be easily obtained: the tea-kettle and the cover of the pot should also be kept down by a weight, to prevent the steam from forcing them up.

If the cask should be too near the fire, the musket-barrel in which the steam is condensed may be prolonged by the addition of the barrel of another musket, or by a wooden pipe. If the barrel of another musket be used, whose bore is not large enough to receive the extremity of the former, one end of it should be heated in the fire, and dilated with a marline-spike. If a wooden pipe be used, it should not be bored with a hot iron; as I have found by experience, that the burnt wood would impart a permanent disagreeable taste to the distilled water.

If we may suppose a ship at sea to have no tea-kettle on board, then let the wooden hand-pump, with which the water or beer is pumped out of the casks, be cut through obliquely, and joined, so as to form an

acute angle. One end of this tube should be fixed into the hole made in the cover of the pot, the other should be fastened to the musket-barrel. By this, nearly the same quantity of water may be procured as by means of the tea-kettle.

It may justly be supposed, that the coppers used for boiling the provisions will, in every ship, contain more than the proportion of two quarts of water for every person on board; if these were furnished with proper still-heads, they would be sufficient to yield in distillation the proportion of three pints of fresh and wholesome water for each man.

From the improvements made in distillation by the ingenious Doctor Hales, published in the year 1757, it appears, that three pints of water could be procured in five minutes, that is, fifty gallons in twelve hours, from a small cylindrical still of Mr. Durand's, by the addition of six pewter plates set edgeways in its head. This still was only fifteen inches in diameter, at the widest part, and held six or

seven gallons. A still twenty-two inches wide, containing 30 gallons, would yield in distillation 100 gallons in the space of 12 hours; and a still 32 inches in diameter, would give 200 gallons in the same time, attended only with the small expence of a bushel and a half of coals, or of a proportionable quantity of other fuel. Three chaldrons of coals are thus more than sufficient to supply 400 men, which is the complement of a 60 gun ship, for two months, with half a gallon of water per day for each man.

These proposals are not confined to speculation; I have frequently tried the experiments on shore, and at sea they have all been repeated with success.

In the year 1768, on board the Dolphin ship of war, in her second voyage round the world, on a passage from Batavia to the Cape of Good Hope, 56 gallons of sea water were put into a still, and 42 gallons of fresh water drawn off in the space of five hours thirteen minutes, with the expence of nine pounds of wood, and

of 69 pounds weight of coals: this was upwards of a quart of water for each man on board *.

In the year 1769, the experiment of distilling with an inverted tea-kettle and musket-barrel, was tried on board his Majesty's ship the Dorsetshire, in her passage from Gibraltar to Mahon, having then Lord George Lenox's regiment on board. In less than two hours the carpenter's pitch-pot was cleaned out for the purpose, fitted with a cover, and the whole apparatus got ready. The only difficulty which occurred, was to insert the spout of the tea-kettle into the musket-barrel; but this was presently surmounted by joining them with some of the carpenter's sheet lead. Twenty-two quarts of sea water were then put into the pot, from which 19 quarts of fresh water were drawn off in four hours, with the expence of ten pounds of wood.

In the year 1773, the experiment of distilling with the hand-pump and musket-

* The particulars of this experiment are given in the third edition of my Essay on preserving Seamen.

barrel was tried on board the Slambol, a trading ship in the East Indies; when, from a pot holding six gallons of sea water, 10 quarts of fresh water were distilled in the space of three hours, viz. at the rate of eighty quarts a day; so as effectually to relieve them from all apprehensions of distress from a want of fresh water*.

---

* Extract from Captain Clancey's journal, on a passage from Bombay to Bengal, in the Slambol, a Moorish ship, in the year 1773.

" Tuesday, November 26, 1773.
" Latitude 16° 44′.
" Long. 5° E. off point Palmiras.
" Thermometer 81°.

" To day sounded " the tanks, and " found in them " 60 inches of " water, which, " at two inches per day, is thirty days water; but " the north-east monsoon and the south-west cur- " rents having so long attended the ship, and re- " tarded the passage, without any visible sign of " shifting, therefore put the crew to three pints of " water per day, resolving by patience, vigilance, " and a good look-out, the only means left to save " our passage at this time of the year, to endea- " vour to keep our ground till the winds and cur- " rents changed in our favour ——Likewise tried " the ingenious Doctor Lind's method of distilling " fresh water from salt; and in three hours made " ten quarts of fresh water, exceedingly clear and

The distilled sea water is purer than spring, river, and even rain water. The taste which it receives from the distilling

---

"well tasted, by this rude substitute for the still "and worm (alluding to a sketch of the apparatus "given on the journal); am therefore in hopes we "shall have no occasion to bear up for water, since "this little contrivance can furnish, with little "trouble, eighty quarts of good drinking water "per day."

From the sketch of the apparatus, and the references annexed, it appeared that Captain Clancey made use of a pot, which held six gallons of sea water, placed upon a common fire; the wooden pump was made to enter a hole cut in the cover of the pot, and transmitted the steam immediately to the gun-barrel, which passed through a cask of cold sea water, in order to condense the steam, and discharged the distilled water into a bucket placed at the lower end of it: near the bottom of the condensing cask was a cock, to draw off the sea water, as often as it grew warm by the steam passing through it.

Captain Clancey had arrived in Ballasore road, but was forced from thence in a gale of wind. On his arrival in the river Hughly, Mr. Davis, surgeon of his Majesty's ship the Dolphin, the gentleman who favoured me with this extract, observes, that he tasted the distilled water, which was the purest and best water he ever remembers to have tasted.

vessel, is, in some measure lessened by throwing away the first running from the still; and is wholly removed by keeping the water for some time, or exposing it to the air, when it will be found an excellent well flavoured water, which will keep perfectly sweet for many years, if put into clean vessels.

The benefit of this discovery is not confined to ships at sea. It is a subject which on many other occasions deserves the most serious attention, as will sufficiently appear from the following extract of a letter sent me from the Havannah, dated the 1st of September, 1762: "Before the "surrender of this place, our distress for "want of water became inexpressible: "I would have given with pleasure half-a-"guinea for a pint of such distilled sea "water as I have frequently drank at "your table. Numbers of our men died "from a real want of water, and many "more from drinking water which was un-"wholesome and poisonous."—Would not a few stills sent from Jamaica, have saved the lives of these men?

On similar principles to those of obtaining fresh water by collecting and condensing the steam of sea water, it becomes necessary to recommend, in cases of a scarcity of fresh water, the employing of that steam for cooking of the provisions, without attempting to condense it; which will prove a great means of saving the fresh water. In the steam of boiling sea water, most sorts of provisions, fresh or salted, beef, pork, fowls, rice, vegetables, &c. may be stewed or dressed, equally well as in fresh water. For this purpose, they may be put into a net or a cullender, and placed in the mouth of the pot containing the boiling sea water; as the Turks dress their favourite dish, a Pillau; or they may be suspended on hooks in the boiling pots, so as not to touch the sea water, the steam being confined by a tight cover.

When a quantity of provisions are to be dressed, the best method will be, to convey the whole steam of the boiling water into another vessel, by means of a pipe. In this last vessel, the meat should be suspended in nets or on hooks, in such a

manner, that the brine or drippings, if the meat be salted, may fall into the bottom of the vessel, and the steam be equally received by the whole.

From what has been said, it is evident, that no person upon, or near the sea, can suffer death from want of water, who will have recourse to the easy means here pointed out of obtaining it.

Having thus used our endeavours to prevent persons at sea from perishing for want of water, our attention will next be directed towards securing them from suffering by a want of provisions.

On this subject our researches are imperfect, when compared with the extensive application of the discovery made respecting the former; ingenuity may there compensate for neglect, but the best means we have been able to trace for averting the dangers of the latter, are confined to precaution. The principal circumstances which limit the quantity of provisions carried by ships to sea, are, the room they take for stowage, and the length of time they will keep good. To extend these

limits has been my endeavour. With this view I instituted an inquiry to discover the most nutritive substance, which, from being small in bulk, easily prepared as food, and capable of long preservation, might be carried to sea in addition to the usual victualling of the ship; and, without taking much room for stowage or the risque of decay, might prove, in times of scarcity, an effectual resource against famine. The observations I am to offer, contain the result of this inquiry.

The substances I have found most fit for the purpose, are powder of salep and portable soup; which convey the greatest quantity of vegetable and animal nourishment under the smallest bulk. An ounce of powdered salep and another of portable soup, dissolved in two quarts of boiling water, become a rich thick jelly, capable of receiving any flavour from the addition of spices. This is sufficient sustenance for one man a day; two pounds of each would serve him a month; and being a mixture

of both animal and vegetable food, it is more wholesome than either used alone.

There are daily instances of persons being supported for many months by a much less nourishing diet, boiled rice, and even by gum arabic alone. Hasselquist, in his voyage to the Levant, informs us, that a caravan from Ethiopia to Egypt, having expended all their provisions, lived for two months on gum arabic dissolved in water; this gum having luckily been part of their merchandize. The gum senega, or arabic, serves as a sustenance for whole negro towns, during a scarcity of other provisions occasioned by a failure of their crops of millet and rice; and the Arabs, who twice a year collect this gum in the inland forests on the north side of the river Niger, have no other provisions to live upon for some months.

The jelly of salep and portable soup are far more wholesome and nourishing than double the quantity, or a gallon, of rice-cake made by boiling rice in water, on which sailors are often obliged solely to sub-

sist for several months, especially in voyages to Guinea, after the bread and flour are exhausted, and the beef and pork have become unfit for use.

The expence of the two articles recommended is trifling. The powder of salep is generally sold for four shillings and sixpence a pound; and a pound of portable soup, which conveys, if properly made, the nourishment of twelve pounds of beef, is sold for half-a-crown.

The superiority of salep to other vegetable substances, is not confined to its conveying more nourishment; it can also be on emergencies used as food without boiling; on this account, it may often be used in situations where other substances cannot be dressed. In preparing some of them, as rice, the consumption of fuel and the waste of water, in the long boiling, becomes also a considerable object.

Salep will form a paste with cold water; ten times its weight of water forms it into a paste or cake; if mixed with more, a separation of the redundant water will en-

sue. This paste, with the addition of a little vinegar, will serve to allay both hunger and thirst, and will keep good for several days.

Salep is not too salt when mixed with sea water; in this case it should not be allowed above six times its weight of water; which quantity is just sufficient to render it palatable, being of itself a very insipid powder.

The addition of spices to the portable soup and salep, will not only render them more grateful to the palate, but also tend to improve their nutritive qualities; as would appear from the following late incident of famine on board a ship at sea.

In the year 1762, while the English troops were at Manilla, a Malaye ship arrived there from Macassar, which, by the shifting of the monsoon, had been detained at sea much longer than was expected; the men had been reduced to such extremities for want of provisions, as to be obliged to subsist for two months almost wholly upon water and spices; the latter, viz.

cinnamon, mace, and pepper, being the cargo of the ship; notwithstanding which, upon their arrival at Manilla, they all, to the number of thirty, were in perfect health.

Salep and portable soup, when kept dry, will remain good for many years.

From what has been said, we may justly draw the following inferences:

As two pounds of salep, with an equal quantity of portable soup, will afford a wholesome diet to one person for a month, would it not be expedient for every ship to carry to sea a quantity of these articles, in proportion to the number of the men, lest from unavoidable accidents, the other provisions might be exhausted during the voyage, or through fire, shipwreck, or other accidents, the crew be obliged to have recourse to their boats? Supposing a boat furnished with eleven gallons of water, two pounds of salep, and two pounds of portable beef-soup for each person, none in it will die of hunger or thirst for at least a month: during which time, the daily al-

lowance of each person will be more than a quart of water, eleven ounces of a strong salep-paste, and an ounce of portable soup. The soup should be allowed to melt in the mouth; and in that small quantity, if properly made, are contained the nourishing juices of above three quarters of a pound of beef. In cases of great extremity, the salep may be mixed with the sea water, and will still be equally wholesome*. Would it not be advisable for ships in long voyages, to carry a quantity of each of these articles, to be issued occasionally, that their other provisions might not be so quickly consumed? Would not salep and portable soup also prove serviceable in be-

* One necessary precaution, which ought never to be omitted in a ship at sea, is, always to have a cask of water either in the boat, or in some convenient place upon the deck, from whence it may be easily conveyed into the boat; as, in cases of fire and many other disasters at sea, when the crew betake themselves to the boats, it is often impossible to go down into the hold for water. The same precaution is equally necessary with respect to the salep and portable soup.

sieged towns, and in the long marches of armies? every soldier, by having a pound of each article given him, could carry more than a fortnight's subsistence for himself, without any inconvenience, to be used in case a supply of other provisions should be cut off.

I may add, as a scarcity of provisions at sea may sometimes proceed from the avarice of the masters of merchant ships, who, from a lucrative view, have taken on board too small a quantity of provisions; if the masters were obliged by the articles of agreement with the men, to pay a stipulated allowance of money for any deficiency that might happen in their provisions during the voyage, as is done in the Royal Navy, would it not tend greatly to prevent the frequency of this distress?

I do not here offer to the public an alimentary powder, to supersede the necessity of supplying our fleets and armies with other food; nor will the discovery of freshening sea water render the common precaution of carrying a stock of

water to sea less necessary: the intention of both these proposals, is only to support life in particular situations of distress, and prevent an untimely death from hunger and thirst.

INDEX OF PLACES.

A

Alexandretta, 357.
Algiers, 39, 152.
America, 34.
Antigua, 127, 222, 251.
Arabia, 87, 120, 228.
Arakan, in the East Indies, 88.

B

Bagdat, in Asiatic Turkey, 120.
Baiæ, near Naples, 169.
Balambangan Island, 112.
Banana Islands, 254.
Banda Island, 88.
Barasatte, in Bengal, 228.
Barbadoes, 57, 127, 222, 231.
Bassora, 87, 118, 119.
Bastimento Islands, 144
Batavia, 100, 160, 200, 229, 256.
Bencoolen, 90, 92, 228.
Bengal, 70, 91, 92, 95, 160, 229.
Benguela, in Congo, 58, 254.
Benin, in Guinea, 51, 58.
Bermudas, 127.
Bombay, 90, 95, 96, 229.
Bonavista, one of the Cape de Verd Islands, 151.
Borneo, 88, 113.
Bourbon Fort, 85.
Brazil, 225.
Bridgetown, in Barbadoes, 127, 222.

C

Cadiz, 136, 178.
Calabar, in Guinea, 51.

Calcutta, 108, 228, 261.
Campania of Rome, 30.
Canada, 34.
Canary Islands, 83.
Cape Coast Castle, in Guinea, 55, 58, 181.
—— de Verd Islands, 5, 84.
—— of Good Hope, 85.
—— Lopez, 58.
Carolina, 36.
Carpenter's River, in Mexico, 131.
Carthagena, in South America, 9, 144, 145.
Catchou, in Guinea, 72, 74, 76, 254.
Cayenne, 128.
Cerebon, near Batavia, 229.
Charnagore, in the East Indies, 229.
China, 87.
Chinsura, in the East Indies, 229.
Corinth, 357.
Coromandel Coast, 98, 104, 153, 154, 302.
Corsica, 33.
Cuba, 145.
Cuddalore, in the East Indies, 99.
Culpee, in the River Hughly, 261.
Curaçoa, 9, 129, 134, 140.

D

Dauphin Fort, in Madagascar, 85.
Diego Reys Island, 85.
Dixcove, in Guinea, 58
Dominica, 158, 224, 231.

E

Egypt, 40, 156.
English Harbour, in Antigua, 223, 240.

F

Ferdinando Po Island, 84.
Florida, East, 36.
—— West, 36, 224, 241.

G

Galam, in Africa, 43.
Gambia River, 49, 57, 66, 72, 163, 180, 181, 183, 202.
Gambroon, in Persia, 87, 117.
Garatte, in Bengal, 228.
Georgia, 36.
Gibraltar, 34.
Gigashore, in Guinea, 71.
Goa, 100.
Gold Coast, in Guinea, 58.
Goree, 58, 174.
Grenada, 128, 199, 231.
Grenadine Islands, 128, 199, 231.
Guadaloupe, 129, 223.
Guiana, 9, 128.
Guinea, 3, 42, 51, 52, 53, 57, 69, 70, 71, 181, 253.

H

Halifax, 35.
Havannah, 145.
Honduras, Bay of, 131.
Hungary, 30.

I

Jamaica, 9, 127, 167, 197, 232.
Java, 88, 101.
India, East, 87, 116, 228, 300.
—— West, 127, 132, 218, 231, 265.
Indrapour, in Sumatra, 89.

K

Karec, in the Persian Gulph, 118.
Kingston, in Jamaica, 232, 235.
Kingston, in St. Vincent's, 128.

L

La Vera Cruz, in Mexico, 129.
Lepanto, Gulph of, 357.

Lisbon, 71,
London, 80.

M

Madagascar, 85, 261.
Madras, 98, 152, 153, 230.
Malabar, Coast of, 99, 154, 301.
Marlborough Fort, in Sumatra, 91, 228.
Manilla, 99.
Martinico, 9, 127.
Maryland, 35.
Mascarenhas Island, 85.
Masulipatam, in the East Indies, 99.
Mauritius Island, 85.
Melinda in Zanquebar, 86.
Mexico, 129.
Middleburgh, in Zealand, 27.
Minorca, 34.
Mobile, in Florida, 37, 224.
Mocha, in Arabia, 87.
Mohilla, one of the Comoro Islands, 261.
Monk's-Hill, in Antigua, 223, 231, 239, 240.
Montserrat, 128.
Morocco, 39.
Mosquitto Shore, 131.
Mosul, in Asiatic Turkey, 121.
Mosambique, in Africa, 86.

N

Naples, 206.
Navy Island, near Jamaica, 236.
Negapatnam, in the East Indies, 99.
Negrais Island, 88.
Nevis, 128.
New England, 35.
Newfoundland, 35.
Nizaben, in Asiatic Turkey, 122.

O

Orleans, in Louisiana, 51.

P

Pensacola, 36, 151, 179, 224.
Pegu, 88.
Podang, in Sumatra, 89.
Pondicherry, 100.
Port Antonio, in Jamaica, 236.
Port Maho, in the Bay of Mexico, 131.
Port-Royal, in Jamaica, 232, 235.
Porto-Bello, 9.
Princess Island, 84.
Prince Rupert's Bay, in Dominica, 224.

Q

Quebec, 34.
Quiola, in Zanquebar, 86.

R

Rio Morte, in Mexico, 129.
Rio Nunes, in Guinea, 71.

S

St. Antonio, one of the Cape de Verd Islands, 84, 175.
St. Augustine's Bay, in Madagascar, 85.
St. Christopher's Island, 127, 222.
St. David's, in the East Indies, 99.
St. Domingo, in the Island of St. Jago, 224.
St. Domingo, in Hispaniola, 9, 128, 139.
St. Eustatia, 9, 129.
St. Helena, 85.
St. Jago, 5, 71, 174, 224, 261.
St. Johanna, one of the Comoro Islands, 261.
St. Nicholas, one of the Cape de Verd Islands, 84.
St. Paul de Loanda, in Congo, 58.
St. Salvadore, in Congo, 58.
St. Thomas Island, near the Coast of Africa, 84, 243.
St. Thomas's Mount, near Madras, 230.
St. Vincent's Island, 128.
Samaring, near Batavia, 229.
Sardinia, 51.
Scambia River, in Florida, 241.

Senegal, 48, 49, 52, 53, 57, 60, 66, 181, 183, 211, 257.
Sierra Leona, in Guinea. 48, 58, 66, 158, 175, 183.
Sillebaa, in Sumatra, 228.
Sluys, in the Netherlands, 30.
Spanish Town, in Jamaica, 232, 235.
Succondee, in Guinea, 58.
Sumatra, 89, 228.
Surat, 98.
Surinam, 9, 129.

T

Tanjapour, near Batavia, 229.
Tellicherry, in the East Indies, 98.
Tobago, 128.
Tranquebar, in the East Indies, 100.
Tripoli, 39, 152.
Tunis, 39, 152.

V

Virginia, 35.
Visagapatnam, in the East Indies, 99.
Volano, Gulph of, in European Turkey, 357.

W

Wampoa, in China, 88.
Whydah, in Guinea, 58, 151, 177.
Wight Island, 222.

Z

Zealand, 27.
Zeitoun, 357.

INDEX OF DISEASES.

A

AGUES. See Fever intermitting.
Apoplexy (a Species of) 257.

B

Bachiers, 306.
Bilious disorders, 14, 41, 92, 137, 140, 302.
Black vomit, 135, 136, 140, 239.

C

Cholera Morbus, 140, 195, 196, 288, 299.
Cholics (bilious) 304.
Consumption. 305.

D

Diarrhoea. See Flux.
Dropsy, 28, 74, 305.
~~Dry Belly-ache, 58, 69, 239, 293.~~
Dysentery. See Flux.

E

Emprosthotonos, 239.

F

Fever, 9, 73, 74, 132. 239.
——— ardent, 11, 139, 140.
——— inflammatory, 12, 62, 107.
——— intermitting and remitting, 10, 13, 19, 23, 32, 33, 34, 36, 91, 102, 105, 117, 136, 313.
——— malignant, 13, 60, 72, 92, 144, 207, 288.
——— nervous, 12, 73, 163.
——— putrid, 11, 13.
——— yellow, 14, 132, 144, 151, 197, 257, 239, 277, 284.

Flux, 9, 72, 74, 92, 104, 132, 134, 288.
—— habitual, 308.

G

Gall Sickness, 28.
Guinea Worm, 59, 60.

H

Hepatitis. See Diseases of the Liver.

I

Intemperies, in Sardinia, 31.

L

Liver, Disease of, 104, 112, 304.
—— Inflammation of, 104, 107.
—— Suppuration of, 108.
Locked Jaw, 239, 295.

M

Mordechin. See Cholera Morbus.

O

Obstructions of the Viscera, 304, 306.
Opisthotonos, 239.

P

Palsy, a Species of. See Barbiers.
Phrensy, 194, 237, 277, 284, 322.

S

Scurvy, 34, 36, 101, 106, 214.
Swelling of the Spleen, 72, 76.

T

Tetanus, 239, 295.

FINIS.

Printed by B. M'Millan,
Bow Street, Covent Garden.